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SELECTED ECONOMIC TRANSLATIONS

ON EASTERN EUROPE

(187th in the series)

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SELECTED ECONOMIC TRANSLATIONS ON EASTERN EUROPE

INTRODUCTION

This is a serial publication containing selected translation on all categories of economic subjects and on geography. This report contains translations on subjects listed in the table of contents below. The translations are arranged alphabetically by country.

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BULGARIA

A Brief Study of the Territorial Distribution of Industrial Production in the Third Five-Year Plan

[This is a translation of an article by Mikhail Enev in Ikonomicheska Misul, Vol IV, No 9, 1959, Sofia, pages 29-44; CSO: 3738-N/a]

The correct territorial distribution of industry is of great importance for the efficient development of industry and the remaining branches of the national economy. Therefor Comrade Todor Zhivkov, in his report before the July Plenum of the Central Committee of the Bulgarian Communist Party, said the following in connection with this important question:

"In connection with the further development of the national economy it is high time to think also about the following question: in the future development of industry and the other branches of material production, the correct distribution of the productive forces must be considered in order to guarantee a relatively even employment of the labor force in all regions of the country and to create in them a working class.

"In solving this problem, of course, we have to keep in mind the economic purposefulness, especially as concerns the construction of large industrial enterprises."1

The Third Five-Year Plan provides for the further extensive development of almost all branches of industry. For several of these branches, particularly for the branches of heavy industry, the development will proceed in great strides. This is to be accomplished by the construction of a number of large new industrial enterprises as well as by the expansion of production in existing enterprises.

The realization of these two lines of development of industrial production during the Third Five-Year Plan places before the planning authorities, before our science and our economic leaders in the okrugs, many responsible tasks concerning the correct distribution of industrial production in accordance with its economic purposefulness.

An analysis of the territorial distribution of industrial production during the Third Five-Year Plan gives us a clear idea of the future development of the territorial distribution of the ten basic branches of industry by administrative-economic okrugs.

* * *

The development and the territorial distribution of the fuel industry in Bulgaria during the Third Five-Year Plan will cause considerable changes in the location of our fuel resources.

Large capital investments are provided for the development of the fuel industry. Their basic part (about 53 percent) is allotted to the development of the fuel industry in Stara Zagora OKrug, mainly for the development of lignite coals in the Maritsa-Iztok Basin. About 29.5 percent of the capital investments are destined for Kyustendil, Dimitrovo, and Sofia Okrugs, mainly for the development of the coal basins at Bobovdol, Dimitrovo, and Aldomirovo. The remaining 17 percent are for Khaskovo Okrug, for the further development of the "Maritsa-Zapad" coal basin, in order to secure coal for industry in Dimitrovgrad.

The territorial distribution by okrugs of the production of coal at the end of the Third Five-Year Plan will be changed as follows (in percent):

Okrugs	1957	At the end of the Third Five-Year Plan
Dimitrovo and Kyustendil	73	46
Stara Zagora	5	15
All remaining okrugs	22	39

As a result of the accelerated construction of the "Maritsa Iztok" System, to which most of the capital investments are allotted, Stara Zagora Okrug will surpass Dimitrovo and Kyustendil Okrugs at the end of the Third and beginning of the Fourth Five-Year Plan and will be first in Bulagarian coal production. Thus the relative share of the coal produced in the okrug compared to the total production of the country will reach 15 percent in 1961, 23 percent in 1962, and about 42 percent in 1964. Owing to this large redistribution of

coal production in the country, the freight movement during the Fourth Five-Year Plan and the following ones will radically change its course. At present the coal movement begins mainly at Dimitrovo and Bobov Dol and spreads out throughout the entire country. In the future, the coal movement will start mainly at "Maritsa Iztok."

There is a considerable unevenness in the present location of the fuel industry. The main quantities of coal are produce in the southwestern part of the country, which makes it necessary to transport them throughout the entire country. The future territorial distribution of coal production will be developed in the center of the country, from which point the individual regions are located no further than 200 to 250 kilometers. The preliminary estimates show that the economiesof the new territorial distribution of coal production will amount to about 50 million leva per year.

The bituminous coal in Sliven Okrug will serve as a basis for the creation of the coke-chemical industry. Almost all bituminous coal for the coke-chemical plant will be produced there. The building of new coal mines in Sliven Okrug will increase even more the coal production of Southern Bulgaria, which until now was insignificant.

The fuel industry is already faced with the problem of using less brown coal, mainly in the Dimitrovo Coal Basin, in order to prolong its exploitation for a longer period of time. This problem must be solved as soon as possible whereby the use of brown coal must be limited during the coming few years (for example, to about 50 percent of the present usage). If the present usage of brown coal could be reduced to one-half, the Dimitrovo basin could be used for about five or six more five-year plans. The solution of this problem depends upon the rate at which the production of briquettes and lignite will be increased and the rate at which the usage of brown coal will be decreased.

At the present rate of extraction of brown coal, the Dimitrovo Basin will soon be exhausted and two new problems will then arise: the future of the industrial development of Dimitrovo and the coal supply of this region after two or three five-year plans.

The brown coal problem will be solved correctly by the following important undertakings: first, an earlier electrification of the railroads, which are the greatest users of brown

cozl; second, increasing the production of briquettes from lignite coal; third, enrichment of the lignite coals and their mass utilization in industry; fourth, maximum replacement of brown coal with electric power for heating as well as in industry, and decreasing their production as soon as possible to 4.0 to 4.5 million tons yearly at the most. The sooner these undertakings are realized the faster will the usage of the brown coal be decreased and the longer will the question of their total replacement be postponed.

Considerable changes will also take place in the distribution of our electric power output.

During the Third Five-Year Plan the capital investments for this branch are destined for Khaskovo and Stara Zagora Okrugs (50 percent), and Plovdiv Okrug (10 percent), with 40 percent going to the remaining okrugs.

After building the new productive capacities in these three okrugs, the territorial distribution of the production of electric power will be as follows at the end of the Third Five-Year Plan compared to that of the end of the Second Five-Year Plan (in percent):

Regions	1957	At the End of the Third Five-Year Plan
Northern Bulgaria	15	5
Southwestern Bulgaria	52	38
Southern Bulgaria	33	57

At the end of the Third Five-Year Plan southern Bulgaria will produce the greatest amount of electric power (57 percent). The reduction of the relative share of the production of electric power in southwestern Bulgaria (SGNS [Sofiyski Gradski Naroden Suvet; Sofia Urban People's Council], Sofia, Dimitrovo, Kyustendil, and Blagoevgrad Okrugs) is due to the construction of new electric power capacities in southern Bulgaria (the "Maritsa-Iztol I" TETs, the "Kurdzhali" Dam and VETs, the "Ivaylovgrad" Dam and VETs, the Batak Hydro-Power System, and others).

The present territorial distribution of electric power production shows a considerable unevenness. It is greatly concentrated in southern and southwestern Bulgaria and is lack-

ing in northern Bulgaria. Thus, while northern Bulgaria gives 34.6 percent of the total industrial production and consumes 22.3 percent of the electric power, only 5 percent of this electric power is produced in northern Bulgaria. The picture is in reverse in southwestern and southern Bulgaria, where 65.4 percent of the total industrial output is produced and 45.6 percent of the total electric power is consumed. Southern and southwestern Bulgaria produce about twice as much electric power as they need. Therefore, part of it is transmitted to northern Bulgaria through long distance transmission lines.

The prospective territorial distribution of electric power production does not remove this unevenness but it is eliminated in general lines by the creation of the electric power network in this country.

The capital investments for the development of the branch "extraction of ores for ferrous metals and ferrous metallurgy" are destined mainly for the development of ferrous metallurgy in Kremikovtsi and Dimitrovo. Two percent of the capital investments are destined for the extraction of ores in Yambol, Mikhaylovgrad, and Varna Okrugs.

At present and in the near future, ferrous metallurgy will be developed in Sofia Rayon and in Dimitrovo Okrug, mainly on the basis of the Kremikovtsi deposit and the deposit at Krumovo in Yambol Okrug. In Sofia Rayon a metallurgical combine, an enrichment and agglomeration factory in Kremikovtsi and a shaft mine in Kremikovtsi will be built, while in Dimitrovo Rayon there will be an expansion of the "Lenin" MZ [Minen Zavod; Mining Plant], and of the former "Mir" plant, which is at present a department of the "Lenin" MZ. Under construction is an enrichment plant for manganese ore in the village of Ignatievo, Varna [Okrug], while in Krumovo Village, Yambol [Okrug], the shafts are being expanded in order to increase the production of iron ore.

The territorial distribution of ferrous metallurgy in Bulgaria is based on the territorial location of the iron deposits, of the fuel, and of the regions of consumption. Only bituminous coal from the Balkan basin will be transported, which is unavoidable, as only this type of coal can be made into coke. A certain amount of coke will be imported from abroad, as the local production will be insufficient. The produced ferrous metals will be transported to the respective enterprises in all okrugs of the country.

An irrational undertaking in the territorial distribution of ferrous metallurgy was the construction (during 1956-1957) of the agglomeration plant in Dimitrovo, which processes iron ore mined in the village of Krumovo, in Yambol Okrug. The cost of transporting the ore is considerable. Thus, 3,398,000 leva were spent for the transportation of iron ore from Krumovo in 1957 and 8,212,000 leva in 1958. If we take 1958 as a basis, the transport costs will increase during the amortization period of the agglomeration plant (40 years) to about 320 million leva (the agglomeration plant itself costs about 40 million leva). Since during the coming years the quantity of transported ore will increase considerably, the transport costs will also be higher than the above figure.

The removal of this discrepancy raises the problem of the construction of a new agglomeration or enrichment plant in Krumovo Rayon (Yambol Okrug) in accordance with the reserves in this region. The means for its construction can be covered for only three or four years by the decrease in the cost of transporting the ore from Krumovo to Dimitrovo. Furthermore, one could also consider the question of the eventual discontinuation of transporting iron ore from Krumovo to Dimitrovo after the construction of Kremikovtsi shaft.

For the development of the chemical industry considerable capital investments are provided, mainly for the construction of new productive capacities. These are concentrated mainly in the following okrugs: 53 percent of the capital investments will be destined for Stara Zagora Okrug (for the construction of a new nitrogen-fertilizer plant, using as a basic raw material the lignite coals of the Maritsa-Iztok Basin), 17 percent for Khaskovo Okrug.(for the expansion of the "Stalin" Chemical Combine in Dimitrovgrad and for the construction of a department for superphosphate fertilizers), 14 percent for Sofia (for the construction of the coke-chemical plant in Kremikovtsi on the basis of the bituminous coal of the Balkan Basin), and 16 percent for Varna Okrug (for the construction of a plant for plastics and for the expansion of the soda plant in Devnya).

With the building of new productive capacities in various parts of the country, the territorial distribution of the production of the chemical industry will show the following changes at the end of the Third Five-Year Plan:

Relative Share of the Chemical Industry by Regions (in percent)

Regions	1957	At the End of the Third Five-Year Plan
Southern Bulgaria	42	59
Northern Bulgaria	30	28
Southwestern Bulgaria	28	13

As concerns the location, the chemical industry is concentrated mainly in four okrugs: Khaskovo--with a relative share of 44 percent (artificial fertilizers and sulphuric acid); Stara Zagora--with a relative share of 19 percent (artificial fertilizers); Varna--with a relative share of 22 percent (calcined soda); and Sofia--with a relative share of 12 percent.

The main changes involve the production of the chemical industry in southern Bulgaria, whoe relative share is increased by 17 percent. This increase is due to the construction of the new nitrogen-fertilizer plant near Stara Zagora and to the expansion of the "Stalin" Chemical Combine in Dimitrovgrad. A change occurs in the relative share of the chemical industry in southwestern Bulgaria, which decreases by 15 percent in spite of the fact that a new coke-chemical plants will be constructed near Sofia. This decrease is due to the faster growth of the chemical industry in southern Bulgaria.

The present territorial distribution of the chemical industry (production of nitrogen fertilizers, sulphuric acid, calcined soda, phosphorous fertilizers) is in three industrial centers--Dimitrovgrad, Kurdzhali, and Devnya. Furthermore, each of these items of the chemical industry is produced in one place only. This requires their transportation throughout the entire country. Thus, the average hauling distances of these products of the chemical industry are quite great for our country and at this stage [of development] cannot be decreased.

The territorial distribution of the chemical production will not undergo essential changes and at the present stage it will remain with almost the same hauling distances, with the exception of nitrogen fertilizers, whose average hauling distance will slightly decrease when the second nitrogen-fertilizer plant in Stara Zagora is built.

Considerable means are also provided for new basic funds mainly in nonferrous metallurgy and are distributed by okrugs as follows: for Kurdzhali and Smolyan Okrugs--44 percent (for expansion of the lead-zinc plant in Kurdzhali and for the shaft mines in both okrugs); for Plovdiv--26 percent, where the construction of a new lead-zinc plant is planned on the basis of the lead-zinc ores in Plovdiv, Kurdzhali, and Smolyan Okrugs; for Sofia Okrug--14 percent (the copper-producing plant was built in Pirdop); for Burgas Okrug--9 percent, mainly for the production of copper ore and concentrate and for the construction of the enrichment plant for copper ore in Malko Turnovo; for Vratsa Okrug--5 percent, mainly for the construction of an enrichment plant for lead-zinc ores.

The territorial distribution of the branch "extraction of ores for nonferrous metals and nonferrous metallurgy" is shown in the following table (in percent):

Okrugs	Production of Ores and Nonferrous Metals During 1957	Production of Ores and Nonferrous Metals At the End of the Third Five-Year Plan
Kurdzhali and Smolyan (lead)	65.5	44
Stara Zagora (lead and zinc)	0.5	3
Burgas (copper)	5.0	4
Plovdiv (lead and zinc)	3.0	13
Sofia (lead)	3.0	11
Sofia (copper)	14.0	20
Vratsa (lead, zinc, copper)	9.0	5

With the construction of the copper-producing plant in Pirdop and the second lead-zinc plant in Plovdiv, the territorial distribution of nonferrous metallurgy is improving.

At present the copper-producing plant in Pirdop works mainly with copper ore from Burgas Okrug. In the future (eventually in three to four years) it will also process the ore of the "Medet" copper deposits, which are located near the plant, but will continue to process still greater quantities of copper ore from Burgas Okrug. The transportation costs for the copper ore from Burgas Okrug amounted 1,227,000 leva in 1958. As the quantity of the copper ore from Burgas Okrug will increase considerably during the following years, the transportation costs will also increase.

The exploitation of the "Medet" copper deposit and some other copper deposits will decrease the cost of transporting ore from the Burgas deposit, but until the [Burgas] deposits are exhausted these costs will not be completely eliminated.

The starting of operations of the copper-producing plant in Pirdop raised the problem of securing for the plant sufficient quantities of copper ore for the full utilization of its productive capacity. As the copper deposits so far exploited cannot completely solve this problem the maximal utilization of the "Medet" copper deposit must be speeded up.

For the development of the "machine-building and metal-processing" branch considerable cppital investments for new productive capacities are also provided. The production volume of the machine-building and metal-processing industry by okrugs will undergo important changes. Thus, the relative share of machine-building and metal-processing in Kolarovgrad Okrug will increase from 0.4 percent to 3 percent with a tendency toward a still greater increase in the future; in Lovech and Pleven Okrugs from 10 to 14 percent; and in Ruse Okrug it will decrease from 11 percent to 8 percent. A certain decrease in the relative share of this branch also affect Varna.

These changes are due mainly to the commissioning of some new plants, such as the one for auto-tractor spare parts in Kolarovgrad, the new machine-building plant in Gabrovo, and the accumulator plant in Pazardzhik, the increased production of motorcycles and bicycles in Lovech, and others.

In general, the territorial distribution of machine-building and metal-processing during the Third Five-Year Plan is becoming more rational. It is being directed into regions which did not have any machine-buildint and metal-processing industry. The construction of the accumulator plant in Pazardzhik, however, constitutes a certain irrationality as it would have been economically much better if it had been built on the Stara Zagora-Ruse railroad line. This could have brought savings of approximately one million leva annually from the decrease in the transport costs alone, as the plant would have been built nearer to the basic raw materials and to the prospective regions of consumprion (mainly for export via Ruse and Varna).

For the development of the "construction materials" branch large capital investments are allotted for the construction of new productive capacities, mainly in the following okrugs: 30 percent in Vratsa Okrug, where a cement plant, a lime-cinder brick plant, and others are under construction; 11 percent in Plovdiv Okrug for the construction of a ceramics plant, a plant for flatware, etc.; 9 percent in Varna Okrug for the cement plant in Devnya and for the construction of a new ceramic plant. The remaining new ceramics plants are under construction in Sofia, Stara Zagora, Tolbukhin, and Khaskovo Okrugs.

The territorial distribution of the new plants for cement, bricks, and roofing tiles will improve the existing location of these plants and well help to liquidate a number of existing disproportions which were inherited from capitalism. In particular, the disproportion between the volume of construction and that of the production of bricks and roofing tiles in Sofia will be eliminated, which disproportion causes large amounts of bricks and roofing tiles for the construction in Sofia to be transported from Pleven, Turnovo, Vratsa, and other Okrugs and thus makes construction expensive and overburdens the means of transport.

The construction of the two cement plants in Vratsa and Varna Okrugs improves the territorial distribution of the cement plants, which has been irrational, since Northern Bulgaria produces small quantities of cement. In general, northern Bulgaria will no longer receive large quantities of cement from southwestern and western Bulgaria. Furthermore, the export of cement will be made possible from these two plants, which are located near the Black Sea and the Danube River.

The territorial distribution of the production of construction materials at the end of the Third Five-Year Plan will be as follows (in percent):

Regions	1957	At the End of the Third Five-Year Plan
Northern Bulgaria	24	37
Southern Bulgaria	41	32
Southwestern Bulgaria	35	31

The territorial distribution during the Third Five-Year Plan of the plants for construction materials will help to a great extent in reducing the average transportation distances of cement, bricks, and roofing tiles as well as the very irrational transportation of these products.

Concerning the development of the cellulose-paper industry, considerable capital investments will go mainly for new productive capacities, most of which are being planned for Vratsa Okrug, where a cellulose-paper combine will be built in Bukyovtsi village. The construction of the new cellulose-paper combine in northern Bulgaria will improve the territorial distribution of the cellulose-paper industry. This plant, however, will require additional capital investments of about 100 million leva, because it is located more than 10 kilometers away from the Danube, which makes it necessary to build a new port, a new regular railroad line running from Cherven Bryag to Oryakhovo, housing, etc.

During the Third Five-Year Plan the "light industry" branch will be provided with large capital investments. They are concentrated mainly in the following: Stara Zagora Okrug--22 percent, Sofia City--20 percent, Plovdiv City--17 percent, Turnovo Okrug--10 percent. Eight other okrugs receive a total of 31 percent of the capital investments.

Most of the capital investment for light industry has been provided for the expansion of the existing enterprises. New textile combines will be built in Vratsa, Blagoevgrad, and Yambol. Therefore, great changes will not take place in the production of light industry by okrugs, but some of the disproportions in the textile industry (separation of the spinning processes from the weaving processes, of the primary processing from the spinning, of the weaving from the finishing processes, etc.) will be eliminated. The elimination of the remaining disproportions in this branch requires considerable reorganization of the existing enterprises and of the connections between the various stages of production in the individual textile centers and enterprises.

The territorial distribution of the production of light industry (of the textile, cellulose-paper, leather and fur, porcelain-enamel, rubber and clothing branches) at the end of the Second and Third Five-Year Plans is shown in the following data:

Relative Share of the Textile Industry
by Okrugs (in percent)

Okrugs	1957	At the End of the Third Five-Year Plan
Sofia City and Sofia Okrug	46	43
Plovdiv City	22	19
Ruse Okrug	9	9
All remaining okrugs	23	29

The present territorial distribution in some of the branches of light industry (mainly textile and glass industry) show disproportions, such as the separation of the various stages of production and insufficient production in some of the consumer regions. Thus, in some towns there are only spinning facilities (19 towns, including Burgas, Varna, Ruse, and Yambol) and in others there are only weaving facilities (5 towns, including Turnovo, Khaskovo, and Bela Slatina). These disproportions which were inherited from capitalism create irrational transport problems and make production more expensive.

During the Third Five-Year Plan some of these disproportions are being eliminated by the creation of the lacking stages of production in several of the towns. For example, in Yambol and Samokov, where there are only weaving enterprises, textile combines will be built during the five-year plan. The new textile enterprises create the necessary unity in the textile industry in several towns.

Furthermore, three new textile enterprises will be built during the Third Five-Year Plan--in Vratsa, Blagoevgrad, and Yambol. This branch is completely new for these towns (except Yambol) and its introduction will have great importance in improving the territorial distribution of the textile industry and increasing the employment of the population in industry.

Two plants for glass products will be built during the Third Five-Year Plan--one in southern Bulgaria (near Plovdiv) and one in northern Bulgaria (in Pazgrad). The construction of these two new glass factories, and particularly the one in Plovdiv, will improve the territorial distribution of these plants, since so far all existing enterprises are located in northern Bulgaria (with the exception of those in Dimitrovo and Sliven). The glassware plant in Plovdiv will be located

in the center of the canning industry, for which the plant will produce the necessary jars. At present the canning industry in southern Bulgaria receives its jars from Dimitrovo, Sliven, and other places, which means that the transportation of fragile glassware and frequent breakage is expensive.

A more substantial change occurs in the relative share of the textile industry in Vratsa Okrug, which will increase from 2 percent to 6 percent with the construction of the textile combine in Vratsa. A certain increase in the relative share of the textile industry will take place in Yambol and Blagoevgrad.

For the "food industry" branch considerable capital investments are also provided during the Third Five-Year Plan; 105 projects will be built and expanded. The new industrial enterprises for the food industry to be built will be spread quite evenly over 27 okrugs, in 56 towns and about the same number of villages. A new food enterprise will be built in every other town. The territorial distribution of the production of the food industry at the end of the Second and Third Five-Year Plans is shown in the following data (in percent):

Okrug	1957	At the End of the Third Five-Year Plan
Plovdiv City Plovdiv Okrug	20	21
Stara Zagora Okrug	9	9
Pleven Okrug Lovech Okrug	9	8
Sofia City	16	15
All remaining okrugs	46	47

With few exceptions, almost all okrugs maintain their relative share in spite of the considerable increase in the production of the food industry.

The Third Five-Year Plan will remove a number of the disproportions inherited from capitalism in the canning, sugar, and other branches of the food industry.

The construction of the canning factories in Aytos, Polyanovgrad, Provadiya, Pavlikeni, and Ruse will reduce the transport of large quantities of vegetables from these okrugs and

towns to the canning factories in Plovdiv and Plovdiv Okrug. In the future these vegetables will be processed on the spot.

The construction of sugar refineries in Lom and Devnya will limit to a great extent the transportation of great quantities of sugar beets from Vidin, Mikhaylovgrad, and Vratsa Okrugs to the refinery in Plovdiv and from Varna and Tolbukhin Okrugs to the refinery in Kameno, Burgas Okrug. A new problem will arise, however, concerning the supply of sugar beets for the two sugar refineries in southern Bulgaria, which will be expanded during the Third Five-Year Plan. It is obvious that the correct thing would be to increase considerably the production of sugar beets, most of all in Burgas, Plovdiv, Yambol, Sliven, and Stara Zagora Okrugs.

With the consrruction of the new canneries and sugar refineries, the territorial distribution of these two branches will improve considerably. This will reduce the long hauling distances for vegetables, sugar beets, sugar, and canned vegetables.

The plant for mixed fodders in Dolna Mitropoliya in Pleven Okrug, which has a very large capacity, receives cereals and fodder from all over the country, and distributed mixed fodders throughout the country. The transport costs alone during 1958 amounted to 5,657,000 leva. It is economically favorable for this plant to supply mainly Pleven, Lovech, and part of Vratsa and Turnovo Okrugs. In the remaining okrugs small enterprises for mixed fodders should be built.

The territorial distribution of the food industry during the Third Five-Year Plan does not eliminate the disproportion in the chemical combine in Kostinbrod (mainly for the production of vegetal oil), since the plant is about 400 to 500 kilometers away from its raw material bases. It receives sunflower seed mainly from the eastern part of the country and pays 5 million leva yearly for its transportation. This disproportion brings up the question of supplying the plant with sunflower from nearer okrugs, for example, from Vratsa, Pleven, Mikhaylovgrad Okrugs, etc. and of building a new extracting plant in the eastern part of the country.

* * *

After the reorganization of the state and economic leadership, the distribution and development of the industrial production by okrugs obtained a particular significance. The even (but not equal) distribution of the new industrial enterprises in all regions of the country is based on the socialist principle of building industrial enterprises near both their raw material bases and their consumers. The purpose is the maximum complex industrial development of all okrugs.

The territorial distribution of the new industrial enterprises in the new administrative-economic okrugs during the Third Five-Year Plan affects the okrugs and a considerable number of the towns in varying degrees. We will analyze briefly the changes which will take place in industry after the acquisition of new basic funds in the various okrugs during the Third Five-Year Plan.

In 1959 the ratio between the production of the light and food industries on the one hand and heavy industry on the other, in the various okrugs, is seen from the following okrug groups:

1. The relative share of the light and food industries is from 10 to 20 percent, while that of heavy industry is from 80 to 90 percent in two okrugs--Dimitrovo and Kurdzhali. These okrugs have the most highly developed heavy industry and the existing ratio will in general remain the same during the Third Five-Year Plan.

2. The branches of the light and food industries have a relative share of 40 to 50 percent in three okrugs (Varna, Sofia, Khaskovo). In these okrugs heavy industry is most strongly developed and has the possibility of increasing further at the expense of the food industry.

3. The light and food industries have a relative share of 50 to 60 percent in only one okrug--Lovech.

4. Most numerous is the group of okrugs in which the relative share of the light and food industries amounts to 60 to 70 percent of all industry--Blagoevgrad, Burgas, Pazardzhik, Plovdiv, Razgrad, Ruse, Sofia City, Stara Zagora, Varna City, Gabrovo, Kolarovgrad, Kyustendil, Pazardzhik, and Sliven Okrugs. This group represents about 43 percent of all okrugs. It includes Sofia City, whose industrial development will make a great stride in quality and quantity during the Third Five-Year Plan. In Sofia City the following more important industrial projects will be built: a metallurgical combine,

iron ore shafts, enrichment plant, a coke-chemical plant, and a TETs, all in Kremkovtsi; a lead factory in Kurilo; ceramics, woodworking, and metal-processing plants, and many expansions of the existing enterprises.

With these large constructions, the relative share of Sofia City, which is in the first place in 1959 as concerns the volume of industrial production , will increase still further and will maintain its lead over all okrugs and cities during the Third Five-Year Plan as well.

In 1959 Sofia is in first place as concerns the volume of the total industrial production, being considerably ahead of the other towns and okrugs. Sofia's industrial production equals that of Plovdiv City, Gabrovo, Burgas, and Vratsa Okrugs put together (they occupy second, third, fourth, and eighteenth places respectively). The ratio between the production of the light and food industries and the production of heavy industry in Sofia City is 66:34. In 1959 and at the end of the Five-Year Plan the following will probably be the branches in Sofia:

Industry	1959 (in percentages) Percent	Place	Probable Place of the Branch at the End of the Third Five-Year Plan
Machine-building and metal-processing	19	1st	1st
Textile	19	2nd	2nd
Food	15	3rd	3rd
Ferrous metallurgy	0	0	4th
Chemical	2	6th	5th

During the Third Five-Year Plan two new branches are to be created in Sofia: ferrous metallurgy and the coke-chemical industry. The branches of TsS of TPK [Central Council of the Labor Production Cooperatives] and the local industry which hold fourth and fifth places during 1959 will be in sixth and seventh place at the end of the Third Five-Year Plan.

The largest buildings during the Third Five-Year Plan are planned for Stara Zagora Okrug: large shafts for lignite coal, a briquette factory, a nitrogen-fertilizer plant, the "Maritsa-Iztok" TETs, canning factories, a meat combine, and expansion of the electric-porcelain plant as well as of the plaster mines, a dairy center, a wine cellar, etc. In terms of volume

of industrial production in 1959, the okrug holds seventh place. The ratio between the production of the light and food industries and that of heavy industry in 1959 is 67:33. In 1959 and at the end of the Five-Year Plan Stara Zagora Okrug is expected to show the following leading branches:

Industry	1959 Percent	1959 Place	Probable Place of the Branch at the End of the Third Five-Year Plan
Food	25	1st	3rd
Machine-building and metal-processing	24	2nd	4th
Textile	14	3rd	5th
Fuel	0	last	6th
Chemical	0	before last	2nd
Electric power	2	8th	1st-2nd

At the end of the Third Five-Year Plan due to a large industrial construction, the economy of the Okrug will undergo a leap, and will reach the strongly developed okrugs of Dimitrovo, Ruse, Burgas, and Gabrovo and will take third to fourth place as per relative share in industry.

The following branches hold first place in Stara Zagora Okrug: the food industry and machine-building and metal-processing, which represent 49 percent of the entire industrial production of the okrug. The greatest development during the Third Five-Year Plan will be achieved by the chemical, fuel, and electric power industries, which are relatively new branches but have great possibilities for development. During the Third Five-Year Plan the chemical and fuel industries will occupy the first two places by virtue of their relative share and by 1965 the first place will be held by the electric power industry. The leading 1959 branches (food industry, machine-building, metal-processing, and textile industries) will occupy third, fourth, and fifth places respectively. At the end of the Third Five-Year Plan, the branches of heavy industry in the okrug will surpass the branches of the light and food industries in the okrug.

During the Third Five-Year Plan Vratsa Okrug will have two new industrial branches: cellulose-paper and cement. Their relative share in the total industrial production of the okrug will increase to the point where they will occupy second and fifth places respectively. The production of these two

branches will be of national importance. Their production--cellulose, paper, and cement--will be consumed in the entire country as well as abroad and will participate in the inter-regional division of labor.

The textile industry in Vratsa Okrug will also develop considerably. This branch will also keep its leading place during the Third Five-Year Plan. These changes in the quantity and quality of its economy will bring Vratsa Okrug up to the level of such okrugs as Sliven and Lovech, whose industrial production in 1959 was fifteenth and sixteenth on the list. The relative share of heavy industry in the okrug will also grow considerably.

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Considerable changes are occurring in the economy of Bulgaria during the Third Five-Year Plan. Thus, in 1959 one of the leading branches is the food industry. By the end of the Five-Year Plan this branch will still be in first place in terms of relative share, although it is decreasing. The second place in relative share is held by the textile industry whihh at the end of the Five-Year Plan will move down to third place. Third place is held by machine-building and metal-processing, which at the end of the plan will move up to second place. In fourth place is the lumber and woodworking industry, which at the end of the Five-Year Plan will move down to sixth place. Fifth place is held by nonferrous metallurgy, which at the end of the plan will move up to fourth place. Sixth place belongs to the fuel industry, which at the end of the plan will move down to eighth place. The seventh place is held by the chemical industry; at the end of the Five-Year Plan it will move up to fifth place. The electric power industry is in eighth place, but at the end of the plan it will move up to seventh.

In 1959 the food industry is a leading branch in 16 okrugs, At the end of the plan it will remain in a leading place in 12 okrugs. In 1959 there was one okrug in which local industry was the leading branch. At the end of the plan there will not be any okrug with such a leading branch.

In 1959 there were no okrugs in the country in which fuel, ferrous metallurgy, or electric power were the leading branches. At the end of the Five-Year Plan these branches will be in the

lead as follows: the fuel industry in one okrug; ferrous metallurgy in one okrug; electric power in two okrugs. In 1959 machine-building and metal-processing is a leading branch in three okrugs, while at the end of the plan this branch will be leading in five okrugs. During the Third Five-Year Plan the branches of heavy industry will also begin to occupy second place in the structure of the okrugs. In six okrugs the branches of machine-building and metal-processing, cellulose-paper, electric power, and chemicals will hold second place instead of the food industry.

The present and prospective territorial distribution of the new industrial production during the Third Five-Year Plan makes it possible for us to draw the following important conclusions:

First, during the Third Five-Year Plan the new industrial enterprises are distributed more evenly and nearer raw materials, fuel, and consuming regions. Some exceptions are made in order to increase the employment of the population in some towns (Pazardzhik, Pirdop, etc.).

Second, the industrial development of several rayons and okrugs which were underdeveloped under capitalism is being intensified. This concerns mainly Kurdzhali, Khaskovo, Vratsa, Kolarovgrad, Smolyan, and other Okrugs, whose relative share in the industrial production before 9 September 1944 was less than 0.5 percent of the total industrial production of Bulgaria. This will contribute to the creation of a workers' class in these areas and to the increase of employment of the population in industry.

Third, the territorial distribution of the new industrial enterprises will eliminate some of the disproportions inherited from capitalism. This is true mainly of the canning, construction materials, coal, and sugar industries. As a result, the long and average transport distances of the following goods will be reduced: sugar beets, sugar, fruits for canning, bricks and roofing tiles, cement, and others.

Fourth, in many rayons and okrugs--Vratsa, Pazardzhik, Mikhaylovgrad, Stara Zagora, and Varna Okrugs; Plovdiv City, Sofia City, Sofia Okrug, Kolarovgrad, and other okrugs and towns--new branches are being created which will help to strengthen their complex development.

Fifth, in many okrugs there will be not only quantitative but also qualitative changes. As a result of the industrial

development of the various branches during the Five-Year Plan the branches of heavy industry, which were leading in 1959 only in three okrugs, will be leading branches in 11 okrugs.

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The question of the correct territorial distribution of the productive forces is even more important in accelerating the economic development of our country; many important matters arise, for example:

a) The new industrial enterprises are to be distributed on a scientific basis--on the basis of okrug material balances and technical-economic reports, by chosing sites which guarantee the lowest cost of production abd the most correct territorial distribution of the branch in question.

b) The complex development of all regions of the country on the basis of the maximal utilization of the local raw materials and wastes must be guaranteed.

The necessity of a complex development as shown by the fact that five of the administrative-economic okrugs have only two branches each, 12 have three each, and only four okrugs have four branches with a relative share of over 10 percent--i.e., above what is necessary to satisfy the needs of the okrug and which could therefore be exported.

c) The economic regional division must be considered an important premise for the correct distribution of the productive forces. In connection with this, the existing economic areas of the country should be defined in the immediate future so that the Fourth Five-Year Plan can be worked out on the basis of economic regions, even tentatively.

d) Industrial production must be distributed so as to increase the employment of the population in industry also in the okrugs and rayons where this employment is low.

e) For a certain period of time the further concentration of new industrial enterprises must be limited in some cities which have a considerable industry and work primarily with raw materials from other okrugs and rayons (Sofia, Plovdiv, Gabrovo, Sliven, etc.).

f) All existing and possible disproportions in all branches of industry must be discontinued and systematically removed. For this purpose, irrational freight transports must be studied regularly through the accounting data of the transport statistics.

g) The Bulgarian Academy of Sciences must participate actively in the theoretical work on the distribution of the productive forces through the committee on productive forces.

The accelerated industrial construction and territorial distribution of the new industrial enterprises in all regions of our country; the development of the economy of the underdeveloped regions; and the creation of a workers' class in them is a clear expression of the correctness of the policy of the Bulgarian Communist Party and its Dimitrov Central Committee, which is firmly and surely leading our country toward communism.

Footnote

[1]Todor Zhikov, "For the Further Implmentation of the Program for the Accelerated Economic Development of Our Country," Rabotnichesko Delo, No 192, 11 July, 1959.

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Technical Progress and Moral Depreciation of Machines in Bulgarian Industry

[This is a translation of an article by Zdravko Zlatanov in Ikonomicheska Misul, Vol IV, No 9, 1959, Sofia, pages 16-28; CSO: 3738-N/b]

Drawing upon Lenin's well-known statement that productivity of labor is the most important condition for the victory of the new social order, the Twentieth Congress of the Communist Party of the Soviet Union confirmed in a resolution on the report of the Central Committee that "a decisive condition for the further growth of the total industrial production is uninterrupted technical progress." The Twenty-first Congress of the Soviet Communist Party devoted much attention to the great importance of technical progress as a factor in the construction of the socialist and communist society and for the victory in the competition with the capitalist economic system and this year's July Plenum of the Central Committee of the Soviet Communist Party was dedicated especially to the fulfillment of the decisions of the Twenty-First Congress as to the acceleration of technical progress in industry and construction.

Technical progress was another of the main questions of the Seventh Congress of the Bulgarian Communist Party, as well as in the adoption by the National Assembly of the law on shortening the time schedule for the fulfillment of the Third Five-Year Plan and for achieving an economic leap forward in the development of the country.

Technical progress is a process of development and mastering of the means of labor and of the technological processes based on the newest achievements of science and technology. It is expressed in the mechanization, automation, electrification, and chemical application in technological processes, in applying electronics and telemechanics, assembly-line and photocopy processes, high-frequency currents, as well as in applying modern methods of metal-casting, modernizing and perfecting the machines, reconstruction, expansion, and technical re-equipment of the enterprises.

The development of machine-building and the training of the engineering-technical and workers' cadres, as well as the quality of the imported machines and equipment and the study and utilization of the most modern technology from abroad are all of the greatest importance in speeding up technical progress.

The possibilities for accelerating the technical process in all stages depend first of all upon the material-production basis of industry.

During the last few years the material-production basis of our industry improved considerably. The relative share of heavy industry grew. Particularly rapid was the increase in the output of ferrous and nonferrous ores and metals. the chemical industry, the production of electric power, and thermal power, and the machine-building and metal-processing industry. New plants have been built with a highly productive technology, the existing industrial enterprises have been expanded and rebuilt, the existing machine stock has been modernized, etc.

The new and modern enterprises belong mainly to heavy industry. The rapid development of heavy industry reduced considerably the possibilities of directing larger capital investments into light industry (which also during the capitalist time was relative well developed), as well as in some less important branches of heavy industry.

A great number of enterprises in our industry still have a low labor productivity, due primarily to the physical and moral depreciation [obsolescence] of the machine stock. This refers mainly to the food, textile, woodworking, fur and tanning, and other branches.

Particularly old, for example, is the machine stock of the textile industry: in the cotton industry 64.6 percent of the ring-spindles and 86.2 percent of the weaving looms are over 15 years old; 31.5 percent of the ring-spindles and 45.3 percent of the looms are over 30 years old, and 19.1 percent of the ring-spindles and 9 percent of the looms are over 50 years old.

The preliminary preparation machines are also very old and used. In the cotton industry, the carding machines are a bottleneck and their productivity is 4.5 kilograms per hour; this is very much lower than the productivity of the new

Soviet carding machines, which produce 7 to 8 kilograms per hour. The pre-spinning machines are also of different makes and systems. Particularly old are the coarse and medium pre-spinning machines, about 21 percent of which were built before 1900.

Most of the shuttles (70 percent) were made before 1944 and their average speed is about 350 meters per minute; the majority of them work at a speed of only 286 meters per minute, while in many countries the average speed of the shuttles is from 800 to 1,000 meters per minute, and in some places it is even 1,650 to 2,000.

Much older and with lower technical possibilities is the machine store of the wool textile industry. Thus, 55 percent of the spindles for worsted fabrics were built between 1890 and 1920, and the remaining 45 percent between 1921 and 1943. Of the striped carded wool carding machines, 32 percent were built between 1890 and 1920, 67 percent between 1921 and 1943, and only one percent after 1944. A great part of the selvaging are so worn out that in the opinion pf many of the managers of the enterprises, no modernization could make them regain their productivity capacity.

The variety of the weaving looms is very great and their technical condition is very poor. About 46 percent of them were built before 1920. They do not have roller brakes and most of them do not have any automatic devices for placing the weft.

In the woodworking industry, low productivity band saws which are worked by hand predominate; frame band saws with automatic handling are very few. Transverse circular [saws] are very uneconomical. The parquetry production is equipped with machines most of which were built 15 to 20 years ago. The plywood production uses machines almost all of which are obsolete models and whose productivity is thus very low.

In spite of improvements, most of the enterprises in the food industry are also equipped with old machines with a very high physical add moral depreciation, and as a result they have a low productivity. Old and worn out machines cause interruptions in the wine production process, which is thus lengthened and is very expensive. In the vegetable oil and canning industry, the production process is also interrupted constantly, and this increases waste and rejects.

The situation is similar in the leather and fur industry, where most of the machines have a productivity of 30 to 40 percent--one third or one quarter of that of the new type machines.

Also old are the machines in some enterprises of heavy industry, including the machine-building and electric power branches.

The age of the metal-cutting machines concentrated in the enterprises of the three former "Machine-Building," "Elprom" [electric-power production], and "Transportation Industry" administrations during 1958 can be seen in the following table (figures in percent of total):

	Date Built		
	Before 1937	1937 to 1944	After 1944
Total metal-cutting machines	8.8	35.0	56.2
Lathes	7.2	32.0	60.8
Drilling machines	12.0	43.0	44.2
Milling machines	7.3	34.0	58.7
Planes	13.9	53.5	32.6
Shaping machines	9.4	19.4	71.2
Slotting machines	10.9	21.3	67.2

The great moral depreciation of the machine stock in some industrial branches, usually accompanied by great physical depreciation, is one of the most important causes of the very low economic indicators in our industry. As concerns the productivity of labor and the cost of production, our country is in one of the last places among the countries of the socialist camp. For this reason, the prices of our goods on the domestic market are very often high, and out competition on the foreign market is low. To correct this situation, our production must be technically renovated.

The above examples show that in order to expand the possivilities for technical progress in our industry, it is necessary to solve not so much the question of physical depreciation as the question of the moral depreciation of the means of production, which is directly connected with the introduction of new technology.

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In analyzing capitalist society, Marx wrote that besides physical depreciation, machines undergo moral depreciation. "They lose their exchange value as soon as machines of the same type and construction can be produced more cheaply or better machines appear to compete."[1]

Therefore, Marx established two forms of moral depreciation of machines. The first form is the result of the cheapening of the production of the machines. In this case the use of the old machines becomes unprofitable for the capitalist since machines of the same construction are produced more cheaply and transfer a smaller value to the manufactured product. The second form of moral depreciation is the result of the creation of new and more productive machines with a great economic effect, so that the old machines become unprofitable to the capitalist.

These two forms of moral depreciation of machines cause a different reaction on the part of the capitalist owner. In the case of cheapening the reproduction of the machines, he continues to use the old machine, because, although it cost him more, it gives the same production effect as the new machines which is cheaper. This only reduces the real value of his basic capital. Under the second form of moral depreciation, the situation is somewhat different. The new and better machines give a greater production effect and although the old machines are still "good," the capitalist, according to the law of competition, has to part with it. In this case the loss from moral depreciation is consideravly greater than in the first form.

Under capitalism, moral depreciation depends upon its own economic laws. The pursuit of profit, and the competitive struggle forces the capitalist to lower the cost of production, which he does mainly by using new and more productive machines. The introduction of new machines to such an extent that they begin to determine the socially necessary labor costs leads to the fact that the operating old machines become morally worn out.

Moral depreciation of the means of production also exists under socialism. But under socialist it arises from different causes and has therefore a different character and different social consequences. The old form is kept but the contents are radically changed.

The moral depreciation of machines under socialism is the result of technical progress, is caused by the action of the economic laws of socialism, and above all by the basic economic law. In order to achieve the goals of socialist production, a continuous increase and improvement of production on the basis of the most progressive technology is necessary. In this manner technical progress is an objective necessity for a socialist society. On the basis of technical progress the productivity of labor is constantly increased, and the production in all branches of the national economy is expanded. And technical progress calls for a constant and necessary renewal of the means of production.

The essence of moral depreciation under socialism and its first form consist in that, with an increase in labor productivity the means of production become cheaper--i.e., part of the original value of the basic funds remains unreproduced. If this part of the original value of the basic funds would also be reproduced, society would receive additional values. The loss in value due to the increased productivity of labor in the production of means of production is covered by the savings obtained in enterprises which use the produced cheaper machines, tools, etc.

Labor productivity under socialism grows faster than under capitalism, and thus guarantees the best utilization of the means of production, speeds up the reproduction of their value, and decreases the losses from the first form of moral depreciation. Thus, a rapid increase in labor productivity under socialism leads to an intensive increase in moral depreciation of the first form, while better utilization of the means of production leads to its decrease.

On the whole, the first form of moral depreciation acts very intensively in our national economy. The original source for this is a constant increase in the productivity of the workers engaged in the production of the means of production. For example, in the machine-building and metal-processing industry labor productivity increase to 162 percent in 1957 compared to 1952, and to 304 percent compared to 1948. The labor intensive processes in the newly manufactured machines were considerably reduced. For example, in the past few years, the metal-cutting machine plant devoted 92,831 minutes to the production of one "C-5" lathe, while now only 71,927 minutes are needed for the production of one "C-5A" lathe, which is an improved model and has a much greater productivity. Considerable achievements in this respect have been registered

in the "Pobeda" DMZ [Durzhaven Mashinostroitelen Zavod; State Machine-Building Plant]. The following table confirms this fact:[2]

	1955 Beginning of Production		1958	
	Labor Needed (Norm hours)	Price (leva)	Labor Needed (norm hours)	Price (leva)
Double worsted-wool carding machine	11,448	680,000	10,799	404,000
Drier for fruits and vegetables	6,988	170,000	5,425	141,600

The reduction in the price of the machines is due mainly to the lowering of their cost, which is a result first of all of the decrease in the labor required for their production. Also of great importance in this respect is improvement in the technological process, mastery of the construction of the produced machines, and a decrease in the costs of the materials per unit of output.

A typical example of reducing the cost of the means of production by reducing the cost of the materials is the building of "C-11" and "C-11A" lathes in the metal-cutting machine plant.[3]

	Capacity of Main Electric Motor (kilowatts)	Revolutions per Minute	Weight of Lathe Without Accessories (kilograms)
"C-11" lathe	4.5	16 to 2,000	2,500
"C-11A" lathe	7.5	16 to 2,000	2,000

There is no difference in the production capacities of these two lathe machines. Their speed is the same as is their productivity. Lathe machine "C-11A" is only an improved, or more precisely a "C-11" construction 500 kilograms lighter, which unavoidably leads to the reduction in its price.

With the manufacture of the "C-11A" lathe, the "C-11" became morally depreciated under the first form of moral depreciation. Therefore, the production of the morally depreciated "C-11" lathe has been discontinued and the plant produces lathes only with construction parameters of "C-11A" lathe.

Under socialism, the essence of moral depreciation in its second form is expressed in the fact that with technical progress the old means of production become obsolete before they become actually unusable. The losses which arise from this are compensated for by the savings obtained from the decreased exploitation costs.

The intensive technical progress under socialism contributes to the constant and accelerated increase of the second form of moral depreciation. There is a simultaneous possibility of counteracting this depreciation and this decreases the losses connected with it by increasing the effectiveness of the means of production, by a fully use of the machines, by a planned development of production, by moving the machine store from one enterprise to another because of the requirements of the national economy, etc., as a result of which the time of the moral depreciation of the machines moves closer to the time of their complete physical depreciation.

And yet the requirements of technical progress mean that the means of production which are technically below the standard of new machines of the same type having a higher productivity must be considered morally depreciated and no longer be manufactured. Under socialism the question of replacement of morally depreciated means of production is solved not arbitrarily but rationally and in an organized way by the socialist state.

The advantages of the new means of production over the old ones may be expressed in an economical use of the raw materials, in the possibilities of using substitutes, in improving the quality of the production, in reducing waste, in improving the conditions of exploitation, etc. However, the greatest advantage of the new means of production compared to the old ones is their increased productivity and therefore reduced labor costs in the enterprises which use them. Thus, for example, the coal combine has a much higher productivity than the excavating machine, the rotating drill than the ordinary drill, the rotating coal power shovel than the ordinary one, the automatic lathes than ordinary mechanical ones, etc.

Our national economy is supplied every year with newer and more modern machines. Our machine-building plants are mastering their production. We can take as a good example the state enterprise for metal-cutting machines, which is constantly improving the production of some types of metal-cutting machines, mainly of lathes. Particularly good were the results of the improvement of "C-5" and "C-5A" lathes. This may be seen from the following table:3

Type of Lathe	Capacity of Main Electric Motor (kilowatts)	Revolutions per Minute	Weight of Lathe With Accessories (kilograms)	Labor Requirement per Lathe in Minutes
"C-5"	2.8	24.0 to 1,050	1,500	92,831
"C-5A"	2.8	23.5 to 1,050	1,350	71,927
	4.5	35.6 to 1,600		

The "C-5A" lathe has a number of advantages over the "C-5," mainly in its possibilities of working with two electric motors differing in capacity, having a greater revolution range, and as a result a higher productivity than the "C-5." Thus, for example, the machine working time of the "C-5" lathe for making a cylinder 70 millimeters in diameter and 200 millimeters in length, at its maximum speed of 1,050 revolutions per minute and with a cutting depth of 3 millimeters and a pace of 0.4 millimeters, is 0.475 minutes, while the machine working time of the "C-5A" for making the same cylinder with the same depth of the cutting (3 millimeters) and the same pace (0.4 millimeters), is 0.312 minutes. A difference in the labor costs in this case will arise not only because the "C-5A" is faster, thanks to which the machine time per unit of work is less than that of the "C-5," but also because with the improved mechanisms of the "C-5A" for centering, starting, etc., its auxiliary time for working on the same detail is less than that of the "C-5." On the other hand, the improved "C-5A" lathe is attended more comfortably and easily, and the quality of its output is better. Furthermore, the "C-5A" is superior to the "C-5" because its weight has been lowered 150 kilograms, and together with this its labor requirements are decreased, which is also an important factor in the reduction its price. For all these reasons, the plant dropped the production of the "C-5" as a lathe with a morally depreciated design.

The comparisons between the technical indicators of the lathes manufactured in the metal-cutting machine plant and the best type manufactured in countries such as Czechoslovakia, the USSR, Switzerland, East Germany, West Germany, and others, prove on the basis of the data of the construction department of the plant, the high quality of our lathes and our great achievements in this respect, and even show some advantages of our production over that of some of these countries.

Unfortunately, however, cases like this one are not yet the rule in our machine-building. As a rule, the designs of our machines are not new or original, and in most of the cases they are a copy of machine systems which have been in use in our enterprises for a long time. Very often the machine-building plants work on the basis of available technical documentation, obtained as a result of the scientific-technical cooperation of the countries of the socialist camp. But there are frequent cases where this documentation is considerably delayed and this contributes to the moral depreciation of the machines even before their manufacture has begun.

The presently used individual and small-scale assembly type of production in our machine-building plants does not solve the question concerning the creation and complete equipment of prototype departments, as a result of which the mastery of the new production is much delayed, and contributes directly to the moral depreciation. Therefore, very often the newly manufactured machines for the textile, food, woodworking, and other industries, prove to have many defects and considerable moral depreciation. The "Pobeda" DMZ, for example, produced double worsted-wool carding machines in 1958 which were a copy of the existing carding machines of the "Harmann" make imported into the country over 20 years before. Furthermore, in the manufacture of the "Pobeda" carding machine (a copy of the "Hartmann" carding machine) many errors were allowed in the copying process, and thus the "Pobeda" carding machine, although newly manufactured, has the same productivity as the "Hartmann" which was manufactured so long ago.

To manufacture carding machines which are a copy of the old "Hartmann" machine now when the other socialist countries, as well as the capitalist countries, manufacture far better ones and with a higher productivity is completely wrong.

There is also something to say concerning the technical qualities of our automatic "Yantra" loom, which has a design that combines the positive elements of the other makes of

looms in use in the country imported during different periods of time. The rated speed of the loom is 210 revolutions per minute, while the actually achieved revolutions after a few months of work are only 190 revolutions per minute. It must be kept in mind that the "Yantra" looms are new and the technical personnel and workers are not very familiar with their construction, and yet the differenee between the rated and actual revolutions is only 20. All this makes us think that Bulgarian looms have better production qualities thar the "EF-44" automatic looms imported from Czechoslovakia in 1951, which with a rated speed of 190 revolutions per minute have reached a maximum actual speed of only 181 revolutions per minute. The Bulgarian "Yantra" automatic looms compete on the basis of their technical qualities with the "Tekstima" automatic looms which were imported in 1957 and 1958 from East Germany and manufactured in the respective years.

In spite of that, however, the "Yantra" loom has an obsolete design because basically it was created by borrowing morally obsolete machine systems, and thus its productivity is considerably smaller than that of modern automatic looms (the Soviet "AT-100-5," which has 240-260 revolutions per minute, the Swiss "Sultzer," which has 265 revolutions per minute, and others).

The morally depreciated machines are being introduced in our industry not only because of weaknesses in our machine-building. In many cases the reason for this is found in the imports. Quite often imported machines are not of the newest type, and thus the expected economic effect is not obtained. Such us the case with the Czechoslovak "EF-44" automatic looms mentioned above, the "Telstima" double worsted-wool carding machines from East Germany, and others.

* * *

The struggle for technical progress and against the negative results of the moral depreciation of the means of production and the economic drawbacks of their use in production must be carried on by all industrial enterprises and above all by the enterprises producing means of production--first of all by the machine-building plants.

With the present small-scale assembly and individual type of production in our machine-building, which does not permit the introduction of the most perfect production and tech-

nological processes in view of the small needs of our country, we cannot achieve any substantial results with regard to the reduction in the cost of the produced machines. We could not obtain by way of amortization deductions any particular reduction in the cost and the price of the goods for the domestic market nor an increase in their competitive ability on the foreign market on this basis.

Very good results could be obtained in the improvement and increase in the means of production produced in our country, as there are no objective obstacles in their direction. The equalization of the technical indicators of our machine-building with the output of the most advanced industrial countries will eliminate the use of morally depreciated machines in the neterprises, will raise their technical level, will contribute substantially toward sharply increasing the labor productivity and decreasing the production costs.

It is therefore necessary to withdraw the morally depreciated machines on time and replace them with new machines as soon as the latter prove their better qualities and higher productivity than the old machines. But since this is not possible to achieve simultaneously for all branches, because of the enormous means required, the most worn-out machines should be replaced first.

The moral depreciation of the relatively better conserved machines must be eliminated by way of modernization. In modernizing machines, which is done usually together with their capital repair, old and imperfect mechanisms are replaced with new and better ones, automation is introduced, etc. This way the productivity of the machines and their other indicators are brought up to the level of those of the newly produced machines and in some bases they even surpass them. Thus, the morally depreciated machines do not remain such any longer; their economic efficiency is increased by their use; and the economic indicators in the work of the industry are improved.

The modernization, which corresponds to a great degree to the requirements of the present rates of economic development of the country, represents a multitude of constantly introduced measures for the improvement of the available machines, in order to maintain their productivity at the level of technical progress. Modernization eliminates the need to replace machines that are still physically fit yet economically unprofitable--that is, it is a means in the struggle above all against moral depreciation of the machines. This way,

modernization is a means for raising the productive capacity of the enterprises, increasing the volume of production, and lowering its cost.

In the past few years, much was done in the modernization of old machines in the cotton-textile industry and in some other industrial branches. These enterprises understood correctly that the modernization of the machine store, as a form of technical progress, is the most important means of increasing the economic effectiveness of the old machines and raising the technical level of the industry to the level of the strongly developed industrial countries.

The most considerable modernization in the cotton spinning industry resulted in increasing the revolutions of the ring machines from 6,500 to 8,500 per minute and of those the drawings from 5 to 7 times to 12 to 14 times, as well as in eliminating some operations and thus considerably shortening the technological cycle. As a result of a well managed modernization of the old carding machines in department No 3 (former DIP "Cotton Textile" [Pamuchen Tekstil]) of the "Telman" DIP, their productivity in 1958 reached that of the carding machines in department No 1 of the same enterprise whose carding machines were installed only a few years ago.

The modernization of the machines in the "Textile Fame" (Tekstilna Slava) DIP was particularly well carried out. The improvement in the movement of the shuttles, the installation of fiber-cleaning mechanisms, brake mechanisms, and others increased the speed of their movement from 286 meters per minute to 600 meters per minute. The increased numeer of chambers, the mechanisms for regulating the level of the cleanser, etc. improved the quality of the scouring, decreased the breaking of the warp, and increased the productivity of the scouring machines. Now in two shifts each machine scours as many warps as it did for three shifts before its modernization. As a result of the modernization of the looms by installing warp brakes, by changing the starting mechansims, etc. the quality of the fabrics improved considerably and the speed of the looms increased by 20 revolutions per minute.

But what has been done is far from enough. Conditions for modernizing exist in the textile as well as in the machine-building, food, and other industrial branches.

Modernization is very important for out industry not only because in most cases it is done very easily and at little cost but also because it results in much fewer disturbances

in the production process. It should not be forgotten, however, that when the machines are very old modernization may prove to be economically unprofitable. Therefore, the positive sides of modernization should not be considered as something absolute and valid under all conditions.

It known that technical progress is the material basis of moral depreciation under the conditions of socialism. Technical progress causes devaluation not only of morally depreciated means of production which are still being produced but also of the means by which the very process of their production is being realized.

Technical progress requires a constant renovation of the means of production, a constant replacement of old means with new ones. From the moment in which new, cheaper, and higher-productivity means of production enter into production, the old means undergo moral deprectiation which lasts until the time of their full physical depreciation, provided that these same means are not removed from use or modernized in the meantime.

Moral depreciation occurs in a different manner depending on the place where the means of production are produced and where they are being used. The building of a new, highly productive machine or of a cheaper machine means that the machines produced in the plant up to that moment and having the same production purpose are morally depreciated and their production must be discontinued. The appearance of shuttleless weaving rooms, which have 1,200 revolutions per minute represents for the loom manufacturing enterprises the starting moment of moral depreciation of the types of looms manufactured until that time. This does not mean, however, that the moment of moral depreciation has also arrived for the consumer enterprises because the shuttle-less looms are so far used only laboratories, are not produced, and cannot replace the old ones.

The moment of moral depreciation of the machines for the consumer enterprises will come only when the new, cheaper, and above all more productive technology is introduced into production and when it directly begins to determine the socially necessary volume of work for the production of certain types of goods.

In the socialist national economy, the moral depreciation of machines as an economic phenomenon arises from economic

processes different from those under capitalism. Under socialism obsolete equipment is replaced immediately after the appearance of new equipment, and its mass introduction occurs in accordance with the state economic plans. In a socialist society the replacement of the old by new technology is done exclusively in the interest of the working people. Its motivation is the saving on social labor and the alleviation of the work of the people.

* * *

A correct theoretical understanding of the questions of technical progress and moral depreciation permits the correct solution of the questions of the utilization of the old technology and its replacement. Technological progress requires a constant replacement of old technology with the most modern. But the different forms of moral depreciation must be approached in a different way. The different approach to the question of moral depreciation of basic funds is necessary not only in connection with the appearance of new, cheaper, and more productive machines but also in connection with the degree of the utilization of these machines until the moment of their moral depreciation as well as afterward.

In the case of the first form of moral depreciation, connected with the appearance of new and cheaper machines of the same type, it is not absolutely necessary to dismount and discard the old machines, since the old as well as the new machines give an equal output under the same use of live labor. The difference in the use of old and new machines consists in the fact that amount of the value transferred to the output in the case of the new machines is smaller than in the case of the old ones, which is reflected in the sum of the amortization and consequently in the cost of production. It is not necessary to dismount the old machines and replace them with new ones even when they have been largely amortized but they continue to have the same productivity as they had when new and the same productivity as the newly manufactured cheaper machines.

The nonutilization of old machines subject to the first form of moral depreciation means an absolute loss to the national economy, which loss is equal to the remaining value of the old machines at the moment of discontinuation of use.

The case of the use of old technology under the second form of moral depreciation--i.e., when new and more productive machines are available--is different. In this case it is always economically justifiable to replace old and morally depreciated machines with new ones. Under socialism there are no social obstacles to replacing old technologies with new. In recent years several measures have been undertaken in the USSR and other countries of the socialist camp in order to replace morally depreciated but still physically usable machines.

Of course, the discarding of old and morally depreciated technology does not mean to declare a war and dismount all of the old but still usable machines. There are usually branches in the national economy which require less technology and are of lesser importance in the national economy which could absorb the old machines.

In introducing new technology, the old ones should not be forgotten as it is impossible to discard simultaneously all old machines and replace them with new ones. The old machines can and should be modernized in order to be used more fully and efficiently. It cannot, however, be considered obligatory to use old and low-productivity machines.

Thus, if the possibilities of increasing the production of new equipment are limited by insufficient labor resources, raw materials, fuel, etc., it becomes necessary to use, in the secondary sectors, the relatively obsolete technology to the point of its full physical depreciation. [However], it is profitable to equip the new and important branches of production with new technology.

Another example: if a group of machines in a given enterprise cannot assure the necessary production in spite of full utilization, they must be replaced, regardless of their physical fitness, with new and more productive machines. This will have a great economic effect--higher labor productivity, increased volume of production, and lower costs.

But if the same enterprise has a single machine of a given type which, because of the type of work it does, is used only six months, discarding it and replacing it with a new one of still higher productivity would only bring unnecessary expenses.

How can we explain the fact that, in spite of the correct understanding of moral depreciation and its consequences, an

overwhelming number of machines in our country are morally depreciated and the enterprises must use them to the point of total physical depreciation. According to some, the reason for this is that our country is moving on a road of continuous industrialization, of constant absolute and relative increase in the volume of industrial production, and that if the old machines were to be discarded and replaced with new ones, the new machines alone would not be able to secure the industrialization of the country. It must, however, be pointed out that in the present stage of development a great stride forward is necessary not only in the volume of production but also in the productivity of labor and in the reduction of the costs of production. This can be achieved only by a more decisive introduction of new technology.

It is also pointed out that the national economy is not able to replace simultaneously all morally depreciated machines with new ones with higher productivity; thus the new equipment is supplied as a rule only to new enterprises. This is a fact and, therefore, a systematic, gradual replacement of the old technology in the branches producing the means of production is necessary, and above all in machine-building as well as in the branches important for our country, such as the textile, food, and others, and after that in all industrial branches. The old technology must be replaced in accordance with the importance of the branches to the national economy, considering the effect that will be achieved. For example, it is especially necessary to replace the technology in the branches producing mainly for export, as the results of moral depreciation show most clearly on the international market. The production of our food and textile industries cannot compete successfully on the foreign markets because of their high cost and poor quality. These branches could become competitive if their capital investments were used for the introduction of a new highly productive technology.

The basic and most important reason for the wide use in our industry of morally obsolete and old nonprogressive methods is the incorrect technical policy of many enterprises and administrations. Equally important for technological renovation is the correct distribution and utilization of capital investments.

The fact that morally depreciated machines are still in use in our national economy means that the possibilities of increasing the volume of production and lowering its cost are not sufficiently exploited.

Footnotes

[1]K. Marx, Capital, Vol I, page 329, Ed. Bulgarian Communist Party, 1950.

[2]The data are taken from the accounts of the "Pobeda" DMZ in Sliven.

[3]The data are taken from the designing department of the State Enterprise for Metal-Cutting Machines in Sofia.

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Bulgaria

PROSPECTS FOR FORESTATION IN BULGARIA

[This is a translation of an article written by Mikhail Mikhaylov, published in Gorsko Stopanstvo, Vol. XVI, No. 2, Sofia, February 1960, Pages 10-15, CSO: 4196-N]

In the past deforestation, a negative expression of man's activity, was typical of our country. The 1949-1950 survey on bare as well as deforested and eroded lands established the existence of roughly 1,000,000 hectares of land needing forestation.

Previous forestation efforts were mainly focussed on the bare and eroded lands of the country, and practically no attention was devoted to the improvement and restoration of existing forests by man. For a long time our forest economy was governed by the principle of natural renewal. Overrating the power of nature and taking no account of the economic development of the country which called for a reappraisal of the old methods, we held on to the principle of natural renewal, while other countries were extensively applying modern methods of conservation.

Furthermore, practically no effort was made to improve and diversify our forests which consisted of species of little value and low productivity. Our methods in the realm of forestry have changed only in the last five years, which is clearly reflected in the Directives for the Fulfillment of the Second Five-Year Plan stipulating forestation in areas under intensive utilization.

Being hinged on the economic needs of the country as a whole and those of the various regions individually, forestation cannot be a goal in itself. Since today Bulgaria develops rapidly, her forest economy is confronte

with three principal tasks of utmost importance, which can be summarized as follows: 1) arresting erosion and preventing torrential damages; 2) increasing productivity by planting highly productive trees on bare lands and improving the variety of existing forests of low value; 3) improving the sanitary conditions of the settlements and beautifying the country. The final results of this afforestation activity will provide Bulgarian agriculture with additional possibilities to increase production. It is unnecessary to try to prove the importance of forestation in the three aforementioned fields. However, we must briefly point out that the issues of forestation is of tremendous importance to Bulgaria.

Anti-erosion forestation was initiated a long time ago. In Bulgaria it has a history of half a century. The main objective of this type of forestation is to conserve deforested lands and protect settlements, means of transportation and arable lands against erosion. Our respective authorities have coped satisfactorily with these tasks. Our achievements in this field have been considerable and we may rightfully take pride in the results. Vast deforested or eroded lands have been successfully afforested and a number of dangerous torrents have been halted and rendered harmless.

The extensive socialist construction in Bulgaria today places increased demands on the anti-erosion and soil conservation projects, adding the protection of dams and irrigation systems as well as the correction of rivers to the purposes which these projects are to serve.

Forestation and soil conservation projects must primarily reduce the deposition of sediment in existing dams, which thus far amounted to approximately 6 million

cubic meters annually. While technical plans for fighting erosion in the cumulative water areas of existing dams and irrigation systems envisage forestation of 60,017.9 hectares of land in the 1954-1965 period, we afforested 34,981.5 hectares, i.e. 58.2% of the stipulated area by the end of 1959. Apart from this, special plans stipulate anti-erosion forestation in other regions of the country, as for instance in Mount Ograzhden, to be completed within definite time limits. It is expected that over 15,000 hectares of eroded lands will be afforested in Mount Ograzhden, 4,500 hectares of which will be completed in the 1958-1962 period.

An idea of the magnitude of the anti-erosion forestation projects can be obtained from the plans for construction of dams and irrigation systems. In 1960 the Administration of Forests and the VPO Agrolesproekt [Agricultural and Forestation Planning Organization] are expected to draw up initial plans for the Beli Lom, Archar-Rabisha, Popovska and Kulska irrigation systems, the cumulative water areas and valleys of the Mesta, Osum, Atara, Kalnika, Purvenetzka and Pyasuchnik rivers and the cumulative water areas of the Yastrebino and Khr. Smirnenski dams, as well as to prepare a preliminary layout and technical plans for the Trakiets, Radomirska and Sredna Tundzha irrigation systems, the cumulative water area of the Maritsa River from Belovo to the frontier, the Iskur River above Samokov and the Zhrebchevo dam in the region of Sliven.

In the years to come new impetus will be added to this hydrotechnical construction activity. We anticipate the construction of dams for irrigation purposes as well as electric power on the Iskur, Arda, Vucha, Suzliyka, Polyanovgradski Azmak, Struma and Osum rivers,

a number of dams on the Vit River, a group of dams on the Maritsa and Kamchiya rivers, the Vinitsa Dam on the Luda Yana river and the Zmeevo Dam.

Most of the aforementioned rivers have a torrential character, which calls for major forestation and soil conservation projects in those regions. According to a rough estimate, about 95,000 hectares of torrent land in the cumulative water areas of these rivers xxx will be afforested. The extent of deforested and eroded land in the cumulative water area of the Struma river only is over 30,000 hectares.

Furthermore, we expect to correct a number of the aforementioned rivers at a length of 350 kilometers. Decree 201 of the Council of Ministers of 1956 concerning the prevention of swamping of arable land stipulates systematic forestation and execution of soil conservation projects to protect these achievements. Therefore, today our activity in this direction has enormously increased, and it is expected to expand more in the future. The extent of anti-erosion forestation will increase annually.

Another important objective of forestation is to improve the condition and increase the productivity of existing forests. The fundamental task of our socialist economy is to achieve a constant increase in productivity in all fields of economic life including forestry. Y. Petkov and Khr. Vuchovski assert in their book "The Fundamental Task of Our Forest Economy is to Increase the Productivity of our Forests" that forestry, as a branch of material production, must develop on the principle of expanded reproduction, i.e. that our forest economy must contribute increasingly larger quantities of timber. One of the prerequisited for attaining this goal is to raise

the productivity of our basic forests utilizing purposefully the full capacity of the basic means of production which are the earth and the wood reserves. The authors also point to the method by which to achieve renewal of sparse and neglected ripe or medium ripe arborescent vegetation, xx xxix xx reconstruction of low forests of no value used mainly for the branches of their trees and establishment of lumbering centers on irrigated lands and river banks. All this can be implemented by means of forestation.

Available data on Bulgaria's forest lands as of 31.12.1958 show xx the extent and xxxxxxxxxxxxx type of forestation to be executed in deteriorated forest areas. Their state of affairs calls for major forestation projects over large areas.

We expect to thicken and intensify a number of sparse forestx units consisting of high arborescent vegetation which is up to 40 years old and grows at a density of less than 0.5-347,740 hectares. We also intend to afforest areas covered with non renewed high trees which are over 100 years old, grow at a density of less than 0.5-122,000 hectares and are ripe for felling as well as 160,000 hectares of forest land which has been under intense felling and, restoration projects notwithstanding, xis xxxxxxxx in an unsatisfactory condition. Afforestation of 376,000 hectares of barren land as well as reconstruction of 714,560 hectares of forests of low value are likewise imminent.

In the last few years one of the principal tasks of our forest economy has been to improve the condition of these areas and increase their productivity.

Some of these lands xx must be afforested within a short period of time. This is especially true of

forests consisting of non renewed trees ripe for felling which have not been felled so far because of the absence of afforestation activity. Since vegetation conditions in these forests are very propitious, any delay in executing the necessary forestation program would prove detrimental to our forest economy. Young forests must also be filled up at the opportune moment, prior to their growing over-ripe

It is important to reconstruct our high and low forests of low value. We could utilize the production potential of these forest lands far better if we replaced the beach, hornbeam, oak and other broadleaf species now covering lands of the IV and V class range with coniferous or other more valuable species.

In view of this, the National Convention of 1958, called to consider the tasks entailed in the improvement of our forests and the increase of their productivity, voted a 15 year general program (1960-1975) which envisages afforestation of at least 1,2000,000 hectares; 200,000 hectares of this total now constitute deteriorated, non renewed and over-ripe forests; 300,000 hectares--sparse forest land; 550,000 hectares--forest areas subject to reconstruction and 150,000 hectares--bare and eroded lands.

The first decisive step in this direction was made in 1960. The mentioned program stipulates reconstruction of 23,000 hectares of unproductive forests as well as afforestation of 29,000 hectares of sparse forest lands, 17,000 hectares of forest areas covered with trees ripe for felling and 21,000 hectares of barren land.

In order to implement this program, we must not only expand the entire forestation plan but also increase

the extent of land to be planted in arborescent species of rapid growth such as the poplar, the Douglas pine and the larch. In the next 15 years we expect to consolidate the poplar economy of Bulgaria over an area of 100,000 hectares, 40,000 hectares of which will be comprised within the forest areas. This enormous project will be initiated in 1960, and in the course of this year some 10,000 hectares of forest area will be planted in poplars.

Forestation for sanitary and aesthetical purposes is becoming increasingly popular of late. In the 1953-1958 period technical plans for the creation of conservation bank and greenery in the vicinities of Dimitrovgrad, Dimitrovo, Varna (the Golden Sands), Nesebur and Velingrad were drawn up, the majority of which have already been fulfilled. In the last 2-3 years land strips along the roads and highways have been successfully afforested.

By Decree 122 of 1957 concerning the verdurousness of our settlements, the Council of Ministers launched an extensive program to beautify the country. Today intense activity in rendering the cities and villages of Bulgaria green, in creating small and large parks throughout the country and in beautifying the vicinities of historic sites, highways, railroads and dams characterizes our lives.

In compliance with the stipulations of the mentioned decree, we are at present engaged in drawing up technical plans for planting verdure along the banks of the Maritsa and Struma rivers as well as the vicinities of railroads and main highways running parallelly to them. The preparation of similar plans for the Black Sea coast from Varna to Obzor, as well as for the expansion of

the Golden Sands and Nesebur projects is also impending. Furthermore, major projects in connection with the creation of additional verdure in Bulgaria to spur international tourism and make the tourist places more accessible are imminent.

We have thus far established that the extent of deforested and eroded as well as deteriorated forest lands subject to reconstruction, afforestation or improvement totals roughly 1,700,000 hectares. If we continue to conduct our forestation projects at the present pace, we would need another 30 years to conclude the entire forestation program and restore our forests to normal condition. However, a prolongation of such an extent in the realm of forestry can under no circumstances be compatible with the accelerated pace at which Bulgarian economy develops at present. Hence, it is imperative to augment the volume of afforestation work to be done yearly. Considering all objective conditions in this stage of the economic development of our mountainous and submountainous regions, we estimate that our forestation total can be increased to 70,000-90,000 hectares annually. As we know, the economic plan for 1960 stipulates afforestation of 90,000 hectares.

Our individual forest units have acquired organizational and technical experience and they are now in a position to organize the work, insure competent technical management and supply the materials necessary to implement a plan of this magnitude.

It is important to make the right selection of arborescent species for the forests of the future, in order to create lasting, resistant and highly productive vegetation. We must conduct our foresta-

tion projects, which are a part of agronomics, only subsequent to investigation of the specific climatic and soil conditions as well as the physiology and ecology of the arborescent species concerned, in order to establish forests of real value. The future success of our forestation activity is mainly contingent upon our knowledge of the soil and climatic conditions in the individual regions as well as the biology of the arborescent species used. This factor must also be decisive in selecting appropriate species and establishing the degree to which they develop under given vegetation conditions. Furthermore, the choice of agro-technology to be employed as well as the composition of the future highly productive forests must be determined on the basis of the same factors.

The major share of forestation projects will be conducted in the Sofia, Blagoevgrad, Kurdzhaly, Kyustendil, Pazardzhik, Vratsa and Stara Zagora ogrugs, since these ogrugs comprise most of the lands subject to forestation. A large number of settlements in the mentioned ogrugs have the characteristics of hamlets, where animal husbandry is the main occupation of the populace. Hence, the question of curtailing pasture facilities now available will inevitably arise with all its harsh implications, when the extent of land to be afforested each year will be determined. This is the main reason why we must concentrate now, prior to changing the economy of the said regions, on the forestation of non renewed forest lands which are covered with over-ripe vegetation, as well as those subject to reconstruction and the partly sparse high forests which are least affected by pasturing.

Good organization is also essential in the implementation of our forestation program, because it insures fulfillment of the agro-technical plans within the set deadlines. The quality of work, the application of maximum mechanization and the curtailment of expenses depend largely on the organization of work. In this connection it is appropriate to ask ourselves whether the creation of specialized forest units (such as the former sections of the UPZ [Forestation Administration] in regions subject to intensive forestation, such as the Struma valley and the cumulative water areas of the Studen Kladenets and Kurdzhali dams would be practical. We believe that this will be imperative in regions where major lumbering or forestation projects will be conducted, such as the Kazanluk, Kustendil, Petevgrad and Razlog districts. A forestation group in Kazanluk, for instance, must be entrusted with anti-erosion and sanitary forestation as well as with the reconstruction of forest lands in the Kazanluk, Pavelbanya, Borushtensko, Gurkovo and Tvurditsa areas. This will enable the respective area to devote its attention to both the management and utilization as well as the renewal of the forest unit, i.e. to forestation and lumbering simultaneously. Thus, both types of activity will follow a normal course.

In 1960, 90,000 hectares of land are expected to be afforested. This is the first year of a period during which destroyed forests must be restored, the condition of existing forests must be improved and the productivity of all arborescent vegetation must be raised. We must mobilize all our forces in order to fulfill this task of tremendous magnitude. Our forest units must uncover and utilize all existing reserves and unfold all their creative potential in order to insure the fulfillment of the 1960 forestation plan.

Caption to photograph following article:

Poplar Forest at the cut of the Danube at Silistra.

CZECHOSLOVAKIA

Chief Tasks of Communications in Slovakia in the Third Five-Year Plan

[This is a translation of an unsigned article published as a supplement to Vestník spojov, No 51, 17 December 1959, Bratislava, separate pagination, Pages 3-7, CSO: 3635-N]

The Board of Commissioners (Sbor poverenikov), proceeding from the tasks and goals approved by the directives of the Central Committee (Ústřední výbor) of the Communist Party of Czechoslovakia (Komunistická strana Československa) and the Government of the Czechoslovak Republic (Československá republika) for the drawing up of the Third Five-Year Plan for development of the national economy in the years 1961-1965, has by Resolution (uznesenie) No 382, of 22 October 1959, likewise designated the tasks of communications for the drafting of the Third Five-Year Plan.

The principles ensuing for the department of communications in Slovakia are essentially identical with the tasks of the department as a whole that were given to the Ministry of Communications (Ministerstvo spojů) by Resolution of the Government No 858, of 14 October 1959.

The Ministry of Communications in November of this year issued a brochure in which it enumerated in detail the main tasks of development of communications in the Third Five-Year Plan in the years 1961-1965 from the standpoint of the department as a whole. For the more detailed information of communications workers on the tasks of the department of communications in Slovakia, the Office of the Commissioner of Communications (Poverenictvo spojov) issues the present supplement, which is a part of the above-mentioned brochure.

The tasks that have been imposed upon communications by the Board of Commissioners are great and in the entire

history of communications in Slovakia have never before been of such magnitude. Their fulfillment will substantially increase the scope and the quality of the communications services furnished to the population in the city and in the country. Communications will thus aid in abolishing the difference between city and country and will further ensure the fulfillment of the demands made upon them by the growth of industry, agriculture, and the other branches of the national economy.

The main point of development of communications in the Third Five-Year Plan is the telephone, since it is one of the most rapid means of communication, without which life in a politically, economically, and culturally flourishing country is unthinkable. The telephone must, however, maintain its lead in swiftness and dependability over means of transportation which modern technology is making ever more rapid. For this reason efforts at the construction of basic capital will aim at the construction of the most modern equipment for the telephone --- at automatic equipment. Automation will without substantially increasing the number of workers guarantee subscribers the possibility of uninterrupted telephone connections, and will create the preconditions for raising the quality of service and for reducing the waiting times.

The other branches of communications will be ensured a commensurate growth by the Third Five-Year Plan. The activity of communications will be aimed at guaranteeing the fulfillment of the political goals of the directives for the Third Five-Year Plan, namely in the years 1961-1965 to attain a level of labor productivity that will make it possible to reduce the working week in communications to 42 hours to the accompaniment of a further mighty development of communications services in accordance with the needs of society.

The Development of the Telephone

The Third Five-Year Plan imposes challenging tasks on communications workers in the sectors of

> increasing the density of the telephone network,
> introducing automatic telephone operations, both local and interurban, and
> expanding the telephone service to subscribers.

Increasing the density of the telephone network will be aimed at increasing the number of main and extension

telephones from 164,700 (80,548 main and 84,152 extension telephones) at the end of 1960 to 436,700 (222,548 main and 214,152 extension) at the end of 1965. The number of telephones serving dwellings and apartment houses will grow from 22,600 in 1960 to 93,500 at the end of 1965. This will increase the density of main and extension telephones per 100 of the population from 4.1 at the end of 1960 to 10.3 at the end of 1965 and will almost give a nationwide index of density of 10.6 at the end of 1965. Especial care will be devoted to the development of subscribers' telephones in the cities, and particularly in Bratislava, where the number of main telephones will grow by 36,000, as well as in residential areas and industrial centers.

To make clear the task awaiting communications workers in this sector, we must quote some figures from the past.

In 1937 approximately 30 percent of the communes in Slovakia had telephone connections. The coverage of the okreses with a telephone network was completed only in 1953.

The density of telephones in Slovakia:

1937	0.64 per 100 inhabitants
1955	2.8
1960	4.1
1965	10.3

During the five years of the Third Five-Year Plan the density of telephones will increase from 4.1 to 10.3, hence 6.2. From the time when the telephone came into use until 1960 it grew only 4.1.

In 1937 there was 1 main subscriber's telephone per 229 inhabitants and in 1955 per 78 inhabitants, in 1960 there will be 1 per 50 inhabitants and at the end of 1965 per 19 inhabitants.

In 1949 there was in Slovakia a total of 41,181 main and extension telephones. In the individual years of the Third Five-Year Plan reckonings call for an average annual growth of 54,400 telephones.

In 1937 2.9 million interurban telephone calls took place in Slovakia. In the entire Czechoslovak Republic there were 18.1 million such calls. The plan for 1960 reckons upon 23 million such calls, that is more than the

entire Czechoslovak Republic had in 1937. For 1965 approximately 50 million interurban calls are planned. Anticipated also is a substantial increase in the number of local telephone calls.

The number of public pay station telephones will increase during the Third Five-Year Plan by 700, particularly in the cities, and their servicing will be perfected.

From these few figures and comparisons it is evident that great tasks await communications workers in the sector of telephone construction.

Especial attention will be devoted to the installation of extension telephones. In 1959 the plan called for an increase of 4500 extension telephones and 7500 main telephones. The planned growth in 1961 amounts to 13,500 extension telephones and 12,800 main telephones (without group connections).

The increased number of new extension telephones will satisfy the demands of growing industry, the standard agricultural cooperatives (jednotné rolnícke družstva), and other factories and enterprises.

Within the framework of automation 95 percent of all telephones are to be connected to automatic telephone exchanges. By the end of 1960 it is presumed that 79.3 percent of the telephones will have automatic operation, which will be introduced on an additional 28 junction telephone networks (at the end of 1960 there will be 14 of them). The anticipated extent of automation will enable a broad circle of users of the telephone to make use of the special telephone services --- indication of the exact time, sports results, results of Sports and Betting (Športka a Sazka), medical service, weather forecasts, etc., and to make use of the telephone without interruption. The special services will be expanded during the Third Five-Year Plan. In addition to automation, the branch will also take other measures to ensure uninterrupted telephone connections, for a brake on the development of telephone service in the past, especially in the villages, was the circumstance that the telephone exchanges had limited hours (until 6:00 p.m., on Saturday until 1:00 p.m., and on Sunday only an hour) and this limited the possibility of using the telephone.

The Third Five-Year Plan also includes the automation of trunk operation between the larger cities, for example

Košice-Prešov, Zvolen-Banská Bystrica, Bratislava-Trnava, etc. To make possible the optimal utilization of local networks, particularly in the cities, for the development of private telephones in apartment houses, there will be established so-called group connections, employing the latest in technological progress.

The capacity of the state telephone exchanges will grow by 167,000 connections from the 109,830 at the end of 1960 and the utilization of it will rise from an anticipated 73 percent at the end of 1960 to 80.5 percent at the end of 1965.

To fulfill the tasks imposed on telephone operations, additional automatic telephone exchanges will be constructed, as well as long-distance cable communications and wire circuits that will make possible the telephonic connection of separate localities even with greater density of telephones. All these installations will add to the speed and quality of telephone service and will make possible a higher percentage of calls put through within 2 minutes. It is estimated that by the end of 1960 90 percent of all calls will be put through within 30 minutes. By the end of 1965 90 percent of all calls are to be put through within 2 minutes.

The Development of the Telegraph and Telex

In the sector of telegraph and Telex service, the plan calls for the establishment of 53 additional telegraph collection offices and an increase of 150 additional telescriptors. The percentage of telegrams delivered within the limit is to rise in the Third Five-Year Plan from 79.8 percent at the end of 1960 to 94.8 percent at the end of 1965.

The Development of Wire Broadcasting

In the sector of wire broadcasting there will be a further increase in the number of reproducers, amounting to approximately 120,000, and additional radio junctions will be constructed. By the end of 1965 there are to be approximately 262,100 reproducers. The development of wire broadcasting will also contribute to extending the hearing range of the Czechoslovak broadcasting stations.

In addition to what has been mentioned above, the branch is in accordance with Government Resolution (uznesenie vlády) No 1184 of 1957 to assume charge of the

street public address system.

The Development of Radio

The program of the Czechoslovak radio is audible on approximately 70 percent of the territory of Slovakia. The amelioration of this situation will be solved by expanding the number of listeners to wire broadcasting and by constructing FM radio stations (ultra short wave). These installations will enlarge the hearing range and improve the audibility of the program of the Czechoslovak sending stations. The reception of FM broadcasts will be made possible by new radio sets or by radio sets of old models equipped with adaptors made and supplied by our industry.

In 1961-1965 an increase in the number of radio listeners is anticipated amounting to 154,000. Thus by the end of 1965 there will be 824,000 of them and 1 license per 5 inhabitants (at the end of 1960 1 per 6.3 inhabitants).

The Development of Television

The further construction of television stations in Slovakia is aimed at covering 95 percent of the territory of Slovakia with a television signal in the early years of the Third Five-Year Plan. This will essentially complete the stage of construction of black-and-white television.

In 1965 in Bratislava construction will begin of facilities for the Second Program, i.e. for the experimental broadcasting of color television. The anticipated number of television license holders at the end of the Third Five-Year Plan is approximately 250,000 (at the end of 1960 there will be approximately 70,000), so that by the end of 1965 there will be 17 inhabitants per television license.

Development of the Postal Service

The postal service has challenging tasks awaiting it, particularly in maintaining operations in face of the new territorial organization of the okreses and krajs. This change will impose great tasks in ensuring the even more rapid transportation and delivery of the mail. Further tasks will ensue from the guaranteeing of operations after the introduction of two-shift operation in factories, enterprises, etc. The services will be brought closer to the

needs of the population by increasing the density of the network of post offices and postal apparatus. In the years 1961 to 1965 the opening of approximately 120 post offices is planned. In the first place new post offices will be opened in cities in which there is a high ratio of inhabitants per post office. Post offices will further be opened in residential areas and industrial centers. All applications for new post offices will be carefully scrutinized and in appropriate instances sub-post offices will be established in their stead; of these during the Third Five-Year Plan 660 are to be established. The sub-post offices will serve as collection stations, will be attached to post offices, and will have as their operating personnel workers of the standard agricultural cooperatives, old-age and other pensioners, housewives, etc., who will not be accounted for in the regular number of communications workers.

The construction of installations for the telephone will to a considerable extent have an influence on the construction of buildings for the postal service, which will be temporarily restricted. In the first place buildings will be constructed for telecommunications equipment, utilizing standard designs. The restriction on building construction ensues from the fundamental principle of the Third Five-Year Plan, in which investment capital is to be used primarily to expand the capacity of machinery and mechanized equipment that will render possible the fulfillment of tasks in the sector of telephone development.

In the process of bringing the postal services closer to the population, the number of postboxes will likewise be enlarged by approximately 2000.

Development of the Postal Newspaper Service

Within the framework of the development of the special marketing network of the postal newspaper service, an increase in newsstands is reckoned upon in the number of 273, in factory centers of the postal newspaper service in the number of 37, and in traveling vendors of periodicals in the villages in the number of 123. The development of facilities for the postal newspaper service will make possible a further increase in literacy in Slovakia and will contribute to raising the cultural level of the population.

* * *

In the directives for the Third Five-Year Plan great emphasis is laid upon the growth of labor productivity. Labor productivity (in communications the index of the state plan is the amount of the financial yield per worker) is likewise an important index in the field of communications. The directives impose an increase of 30 percent in comparison with planned productivity for 1960. To attain such a degree of labor productivity, communications in Slovakia must in 1965 produce 358.1 million koruny more in revenue than is planned for 1960. The greatest increase is expected in revenues from the telephone service. While revenues from the postal service (including the postal newspaper service) will increase 25.3 million koruny in comparison with the plan for 1960, revenues from the telephone service will increase by 284 million koruny.

The growth of labor productivity prescribed by the directives for the Third Five-Year Plan in communications will guarantee a reduction in working hours, which is also to be realized in the Third Five-Year Plan.

From this comparison it follows that communications workers must aim at the production of income, mainly from the telephone, since this will create the optimal preconditions for the construction of additional facilities and equipment. The investment capital allotted in the Third Five-Year Plan is more than double the amount allotted for the Second Five-Year Plan, the largest share being earmarked for the development of telecommunications and for the construction of ultramodern telecommunications equipment. Existing installations will be modernized. Hand-operated exchanges will give way to automatic ones, wire lines to cable ones and later to facilities for wireless communication. From the economic standpoint, therefore, conditions must also be created for the return to the state budget at the earliest possible time, in the form of revenues, of the investment capital that has been expended. The branch has an interest in producing increased revenues. But it also has an interest in producing revenues for services that have actually been rendered, not those that are achieved, for example, by billing for calls that have not taken place or by charging unrealistic rates, that is to say earned dishonestly.

So that communications equipment can readily serve its purpose at any time, the branch will devote all the more attention to its maintenance. For this purpose the force of competent workers will be expanded, trained, and sup-

plied with ultramodern tools.

A further important index of the plan for the development of communications in the Third Five-Year Plan is the economic result. In 1965 communications in Slovakia are to make a profit of 89.9 million koruny, and in the individual years of the Third Five-Year Plan are to put an end to losses. In 1960 there is still a planned loss of 1.3 million koruny. The task will be fulfilled if planned revenues are achieved and at the same time the capital allotted for expenditures is used economically. The plan for the last year of the Third Five-Year Plan presupposes a reduction of planned outlays per koruna of revenue of 9.9 percent in comparison with 1960.

The reduction of net costs, i.e. the exclusion of all superfluous expenditures and the scrutinizing of the necessity and the appropriateness of every expense item, is the duty of every communications worker. The plan approved for the Third Five-Year Plan is law and only such measures must be realized as are connected with expenditures guaranteed by the plan or capable of being made out of capital savings on other items of the plan.

For the increased tasks of the Third Five-Year Plan the branch of communications in Slovakia has been allocated an additional 6,004 workers. With these workers it is reckoned that communications facilities will be constructed and also, in particular, telecommunications operations will be expanded. Every allocation of additional personnel must be appropriately weighed from the economic standpoint. Not every expansion or introduction of a new service can be made conditional upon the availability of new workers. The organization of labor, mechanization, and automation must substantially contribute to the acquisition of the necessary labor force. An increase in the labor force essentially influences the costs of every economic unit.

Commensurate with the number of personnel, communications have for the Third Five-Year Plan been allocated wage funds that will increase 38.3 percent in comparison with the planned wage funds in 1960.

* * *

The Third Five-Year Plan ensures communications in Slovakia a hitherto unprecedented development. It ensures that communications in Slovakia will approach communica-

tions in the Czech krajs, makes possible the furnishing of communications services to the branches of the national economy and to the public, and does away with the backwardness caused by preceding regimes.

The tasks ensuing from the directives for the Third Five-Year Plan are realizable and will be realized with the active collaboration of all communications workers and with the assistance of party and trade union organizations and of branches of the other social organizations. Fulfillment of the tasks, however, is conditional upon the initiative of all communications personnel, new forms of work, and the development of socialist competition, the pledge movement, and socialist labor brigades.

If every communications worker and every communications organization fulfills the tasks imposed by the plan, they will aid the fulfillment of the Third Five-Year Plan and thereby contribute to the completion of socialist construction.

CZECHOSLOVAKIA

The Hricov-Miksova-Povazska Bystrica Water Power System

[This is a translation of an article by Jozef Tarapcik in Stavba, Vol VI, No 11, November 1959, Bratislava, pages 332-341; CSO: 3737-N]

The Hricov-Miksova-Povazska Bystrica water power system is a part of the systematic utilization of the main section of the Vah River. It is the section from the confluence of the Vah with the Orava River to its confluence with the Danube (Figure 1). The above system is located on the middle Vah River beginning at Zilina. The Vah River, after it is augmented by waters from the Kysuca and Rajcianka Rivers, becomes a relatively large stream with a basin of 7,148 square kilometers and a mean flow of 129.3 cubic meters of water per second. Below this section, the Vah River has only minor tributaries, so that a large power potential is concentrated at the beginning of its middle section.

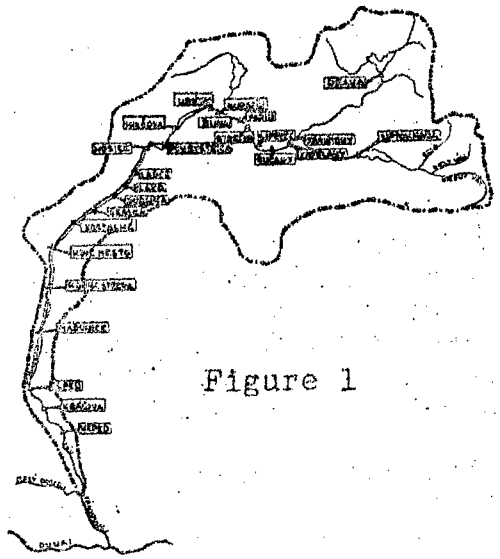


Figure 1

This water power system uses the section between Zilina (estuary of the Kysuca River) and Povazska Bystrica. The utilized head between the Hricov and Nosice dams is 47 meters. The utilized section of the river is about 35 kilometers.

The turbines use 500 cubic meters per second and utilize an average of 94 percent of the annual natural flow at this section. The construction of the Orava Dam has increased this usage to 95.5 percent. It will rise by an additional 1.5 percent after the completion of the dam near Liptovska Mara.

The over-all planned output of the Hricov-Miksova-Povazska Bystrica hydroelectric power plants will be 186.3 metawatts; the average annual utilization of their capacity

will be 2,200 hours--i.e., six hours of full daily operation. The practical output will be 186 megawatts, which will be achieved by the reconstruction of Miksova. The guaranteed daily minimum performance under the minimum flow, which will be 47 cubic meters per second with the aid of the Orava Dam, will be approximately two hours and 14 minutes. The water power system may be classified as a peak performance system owing to its high water intake and the respective utilization of its capacity throughout the year.

The system will accumulate 6.4 million cubic meters at its upper end in the Hricov reservoir; this amount will rise to 8 million cubic meters after the scheduled 60-centimeter rise of the water level. This operational accumulation will guarantee the daily balancing of the flow and a full peak utilization up to a flow of 186 cubic meters per second. A partial weekly balancing will be possible with a flow under 186 cubic meters per second. Flows of more than 186 cubic meters per second last only 45 days per year, and a semi-peak performance is possible during that period.

The 500-cubic meter per second intake and the reservoir with its 8 million cubic meters of operational volume will guarantee not only the possibility of building the Strecno-Zilina section with an assumed capacity of 500 cubic meters per second but an even higher intake up to 800 to 900 cubic meters per second; a required three-hour peak performance will call for a 4.3-million cubic meter reservoir.

The lower end of the constructed water power system is terminated by a discharge channel leading to the Nosice reservoir, with a weekly accumulation and operational volume of 24.6 million cubic meters. Nosice, with its 390-cubic meter per second intake, will not be limited in its performance.

The Hricov-Miksova-Povazska Bystrica water power system fits well into the whole system of utilizing the Vah River, and its higher intake reflects the trend in electric power development where water power systems are supposed to cover peak consumption of electric power. The system represents 76 to 83 percent of the present capacity of the hydroelectric plants operating on the Vah River and 43 percent of their annual output. It will represent 20 percent of the installed capacity and 16 percent of the output of the entire system of the main section of the Vah River after its completion. It will represent almost 200 percent of the installed capacity and 70 percent of the annual output of the projected Wolfsthal dam on the Danube; we have to bear in mind that the production

of the Vah system will have a peak-performance character. The above comparison indicates the importance of the system for our electric power production.

The Vah River between Zilina and Povazska Bystrica will be utilized by means of a derivation channel along its right bank. The system is made more economical by its correct design, a balance between the necessary excavations and embankments, the location of the derivation channel in the higher terraces, a new method of regulating brooks, shortening the length of the settling basin of the Hricov Dam, the construction of the hydroelectric plants without Larssen stone walls, the new method of constructing the reserve outlets, and other details in the construction. All this has made the system the best not only in Slovakia but throughout Czechoslovakia as well, as far as power and economic indicators are concerned. The described sector of the Vah River has a smaller potential power than the sector utilized by the water power system of Nosice, Skalka, and the Krpelany-Sucany-Lipovec group. However, the new concept of its design makes it more efficient, as is illustrated in the table below.

Water Power Installation

	Skalka	Nosice	Krpeľany Sučany Lipovec	Madunice	Orlík	Hričov Mikšová Považská Bystrica
Cost of installation in million koruny for NK 11*	324	966,6	1110	470	1970	1160
Installed capacity, Mw	21	66	95	45	340	156,5
Average annual output in Gwh [?]	90	180	280	160	390 (270)	410
Cost of installed kilowatts in koruny	15 400	14 600	11 700	10 400	5050 (7300)	6230
Cost of annual output, Kcs	3,60	5,35	4,00	2,94	5,05	2,78
Power potential per kilometer in Gwh	30	30	30	20	—	24

*925 million according to RS 59

The basic power and economic indicators prove that the Hricov-Miksova-Povazska Bystrica system is the most advantageous one. Its disadvantage is its small accumulation volume, but this is partly offset by the Orava Dam. The situation will further improve after completion of the dam near Liptovska Mara as well as other water power installations of the Vah River system.

Conditions for Navigation. The completed system, besides its electric power, will provide 35 kilometers of navigable waterway for 1,200-ton Danube barges. After the construction of the Siladice, Sered, and Soporna sections, the Vah River will be navigable up to Zilina. The completion of the waterway will require the construction of navigation installations at the individual dams and the lifting of several bridges at a cost of about 280 million koruny (according to preliminary estimates). The speed of the flow in the derivation channel of the Hricov-Miksova-Povazska Bystrica system will be as much as 1.65 meters per second at the peak load; in view of the larger size of the channel, this speed will not constitute a much bigger obstacle to navigation than the 1.2 meter speed in smaller channels of the first and second groups.

Effect on Land. The system covers 852 hectares of land, which includes 352 hectares of arable land, 307 hectares of meadows and pastures, 29 hectares of building area and gardens, and 164 hectares of gravel. The system is located in an area with an annual precipitation of 700 to 800 millimeters; in our climate such an area does not require irrigation. In order to provide future opportunities for irrigation and higher yields, especially of crops, the UP [Uzemni planovani; Regional Planning] prepared a study on irrigation by spraying which might multiply the yields several times.

The Hricov Water Power Installation

Temporary Structures

The social installations of the construction site were erected as permanent buildings near the community of Horny Hricov on the left bank of the Vah River. They consist of housing for workers and employees, kitchens, a boiler house, a laundry, a house of culture, a first aid unit, and the administration of the buildings.

The operational installations of the construction site consist of a sorting installation combined with a washing and crushing plant, a stockyard of prefabricated parts, cement silos, a concrete mixing plant, and transportation of concrete by cable car. Besides that, there are a number of minor installations, such as garages, workshops, laboratories, etc. needed for the construction.

There is also a provisional bridge across the Vah River 240 meters long, connecting highways 18 and 507. The main purpose of the bridge is to facilitate traffic from the left to the right bank during the time of relocation of the Hricov-Zilina railroad line and highway 507.

Permanent Structures

The Hricov weir (Figure 2) has four fields 18 meters wide. The water rises 10.1 meters between the bottom at an altitude of 317 meters and the maximum water level at 327.1 meters. The units are two-chamber segments, where the lower segment leans against the upper segment--i.e., the reverse of the usual type of hook segments. This design reduced the weight of the structure by 214 tons of steel. Also, the weir is equipped with a shorter settling basin (4 meters against the usual 32 meters); this reduced the volume of concrete from 60,000 cubic meters to 35,000 cubic meters, the volume of the construction pit and the length of the Larssen stone wall by half (i.e., 900 tons of steel less), as well as pumping of water from the construction pit and the volume of the excavations. The dimensions of the Hricov weir are designed to permit a flow of water of Q = 3,800 cubic meters per second at the normal water level at an altitude of 326.5 meters above sea level when all four fields are open, and a flow of Q = 2,500 cubic meters per second when only two fields are open.

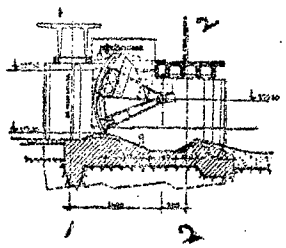


Figure 2
Hricov Weir
1) Axis of manipulation bridge
2) Axis of highway bridge

The rock of the foundation is Orlov sandstone, with veins of slate; the sandstone has an over-all strength of 800 to 1,000 kilograms per square centimeter. The pressure from the weir to the foundations is transmitted through pillars which form a simple static structure. Mechanisms are used to move the dual chamber segments. The segments can be hoisted on both sides. An even lifting of both ends of the segments is ensured by an electrical axis. The movement of the individual segments is controlled from a manipulation building or from the individual pillar cabins.

A manual drive is used only for the final centering of the segments. The speed of the segment movement is 25 centimeters per minute.

The hydroelectric power plant (Figure 3) has three turbines with an intake of 3 x 166 cubic meters per second; the maximum head of the power plant is 10.7 meters and the installed capacity of all three aggregates is 34.7 megawatts at an intake of 400 cubic meters per second. The intake of the turbines at the normal operational head is 500 cubic meters per second.

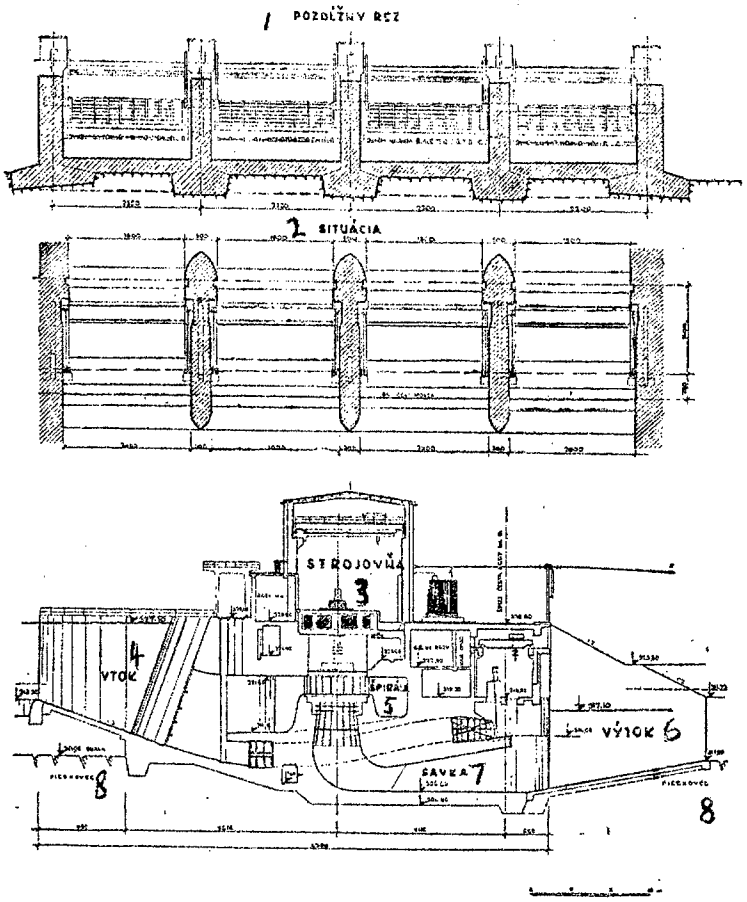


Figure 3. Cross-section of the Hricov Electric Power Plant machine room

1) Longitudinal section
2) Situation
3) Machine room
4) Inflow
5) Spiral
6) Outflow
7) Intake
8) Sandstone

Characteristics of the Turbines

Diameter of running wheel	5,000	millimeters
Revolutions	93.8	per minute
Revolutions (continuous)	230.0	perminute
"Skratovy" [/[moment	770,000	kgm [kilogram meters?]
Inertia mass GD^2	4,370	tm^2 [ton-meters?]
Capacity of generator	14,000	kilovolt amperes at cos φ = 0.75 to 0.83
Output of transformer	16,000	kilovolt amperes

The turbines are the prototype of those which are supposed to be used for the Danube water power installations. The thrust bearing is located on the head [lid?] of the turbine. This is the first hydroelectric power plant of its size in Czechoslovakia with the above location of the bearing; the bearing load is not transferred to the concrete circular plate but is transmitted directly to the lower masonry rink and the concrete mass by means of the stationary blade of the guide wheel. The generator has the bearing mounted below its body. The outlet leads to a 10.5-kilovolt switch room located above the intake. A 10.5/100 kilovolt block transformer is located above the switch room, so that the 100-kilovolt switch house receives the high-voltage transformed current through aerial lines. This design saves high-voltage cables, which are in short supply. The reserve outlets of the plant are designed so that each turbine block has two pipes with a total capacity which is equal to the intake capacity of the turbine. The advantage of this design is the possibility of utilizing ejection in case one of the turbines is out of order. Another advantage is the sparing of the overflow installation adjoining the plant; this arrangement makes the whole installation more economical, makes possible a synchronization of the reserve outlets with the turbine, and prevents the formation of surge waves.

From the construction point of view, the plant building is more complicated because the reserve pipes are installed during the construction together with the concrete work. The construction of the hydroelectric power plant is a combined assembly operation. The plant is located on suitable geological formations--i.e., on Orlov sandstone mixed with slate layers.

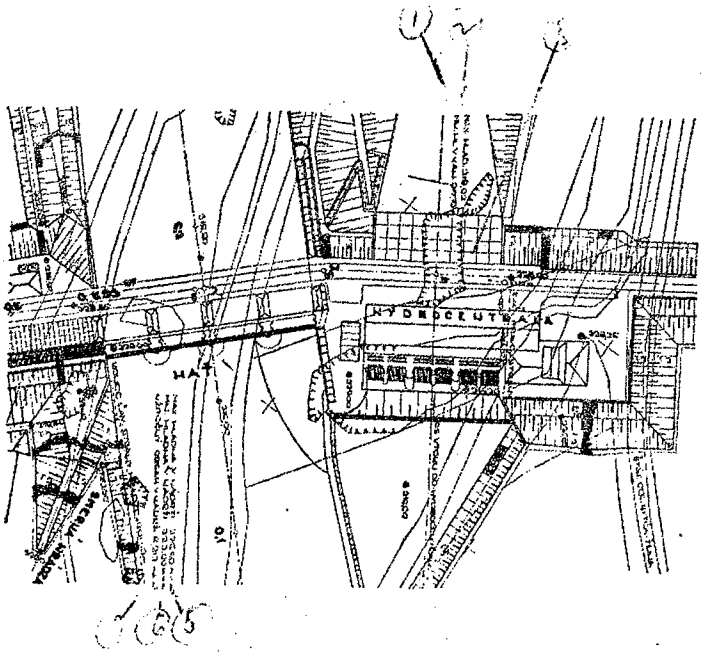


Figure 4

Hricov Water-Power Installation

1) Maximum water level, 318.03 [meters]
2) Minimum water level, 317.10 [meters]
3) Hydroelectric power plant
4) Axis of inflow into the plant
5) Maximum water level in reservoir, 326.6 above sea level
6) Minimum water level in reservoir, 323.0 above sea level
7) Useful capacity of reservoir, 6,219 million cubic meters

The Hricov plant will have a big 100-kilovolt switch house with 14 panels. It will be linked to Ostrava, Zilina, Sucany, Varin, Streono, and Miksova, and it will have another outlet to Povazsak Bystrica with a planned 220-kilovolt switch house. It will require more efficient switches (3,500-kilovolt amperes) than have yet been in use in Czechoslovakia.

The excavation for the hydroelectric power plant and the dam is the same; this makes possible a better organization of the construction and assembly operations, reduces the volume of pumped water, and permits the use of a common installation for concrete transportation for both construction units. The geological conditions at the construction site are characterized as flysch Carpathian. The ground contains alluvial deposits 9 to 10 meters thick of the Var River with Orlov sandstone and slate layers.

The maximum heights of the earth embankment in Hricov (Figure 5) at the point where it crosses the old river bed is 12.5 meters above the terrain. The embankment is built of gravel mixed with earth on the water side. The alluvial deposits between the water-tight earth section of the embankment and the impermeable ground are highly

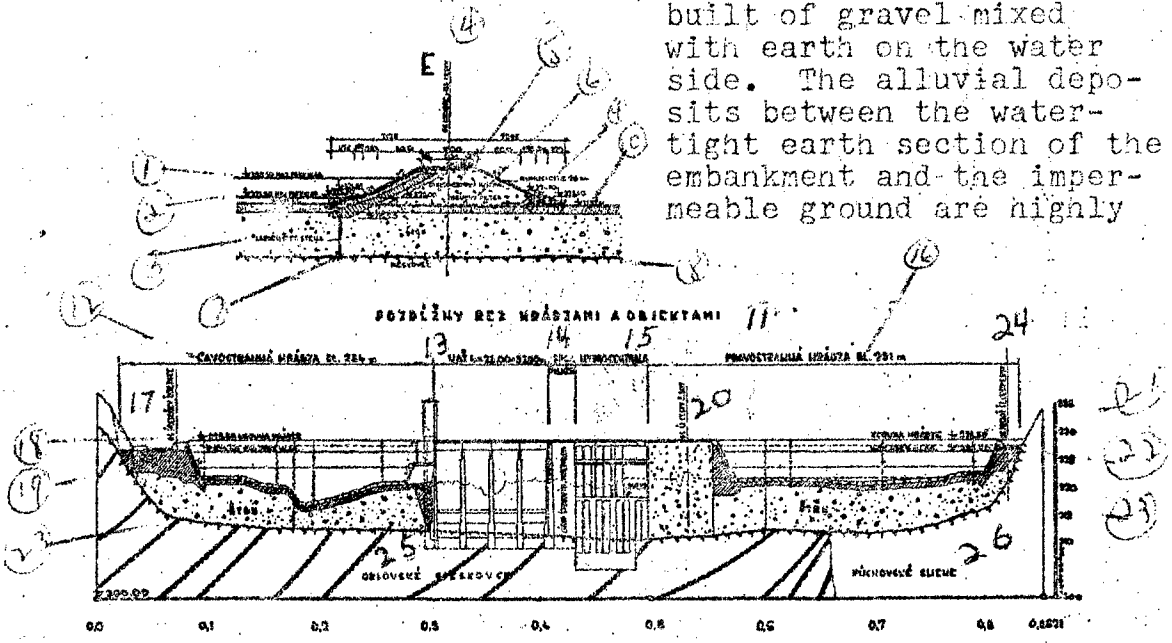


Figure 5

Earth Dam in Hricov

1) Maximum water level
2) Minimum water level
3) Larssen stone wall
4) Axis of the dam and bridge
5) Gravel-sand material
6) Reverse filter
7) Gravel
8) Sandstone
9) Humus + "ostic"
10) Terrain

11) Longitudinal section of banks and structures

12) Left bank, 289 m
13) Weir
14) Connecting pillar
15) Power plant
16) Right bank 28. m
17) Axis of relocated railroad
18) Crest of dam
19) Maximum water level
20) Axis of old highway 507
21) Crest of dam
22) Maximum water level
23) Gravel
24) Axis of relocated highway 507
25) Orlov sandstone
26) Puchov marl

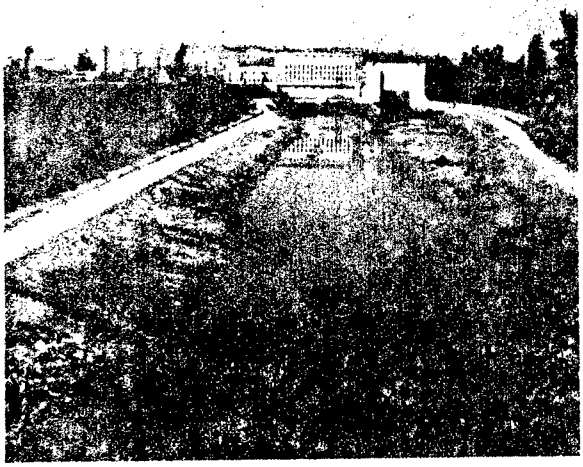
permeable; the permeability coefficient reaches the value of 1.7 to 4.0 x 10^{-3} meters per second. The alluvial layer is made watertight by a gravel screen sunk into the impermeable ground. A road will lead along the crest of the embankment as well as across the dam and the plant; it will link highways 18 and 507. The slope of the embankment on the water side is protected by stones between the lines of fluctuation of the water level. The other side will contain drainage of gravel or waste quarry material formed from sandstone in the excavation pit.

The location of the dam and the hydroelectric plant as well as of the overflow channel makes it necessary to rechannel 6.2 kilometers of the Vah River below the dam. The new section of the Vah River has two parts. Part No o, near Oblazova, is 1.6 kilometers long, and part No 2, below the dame, is 1.7 kilometers long. The rest of the new layout uses the old river bed. The design was made according to a new method by Professor Altunin. The bed was not dredged to its full profile or width. Part of the material in front of the dike was left undredged. The protective dike was not constructed on the basis of its final depth; the direction of the canal is secured by stones partly sunk into a ditch, partly placed above the terrain. Between the stones and the dredge part is another undredged strip of the bed. The undredge portion of the bed will be bashed away by floodwaters. This method reduced the cost considerably.

The newly regulated section of the Vah River in the reservoir is 1.4 kilometers long and its purpose is to provide for a smooth flow of floodwater through the open weir and a smooth overflow. This section is fully dredged in order to prevent the formation of gravel banks directly at the dam during floods, and to protect manipulation; otherwise the operation of the whole Hricov-Miksova-Povazska Bystrica system could be interrupted for a time.

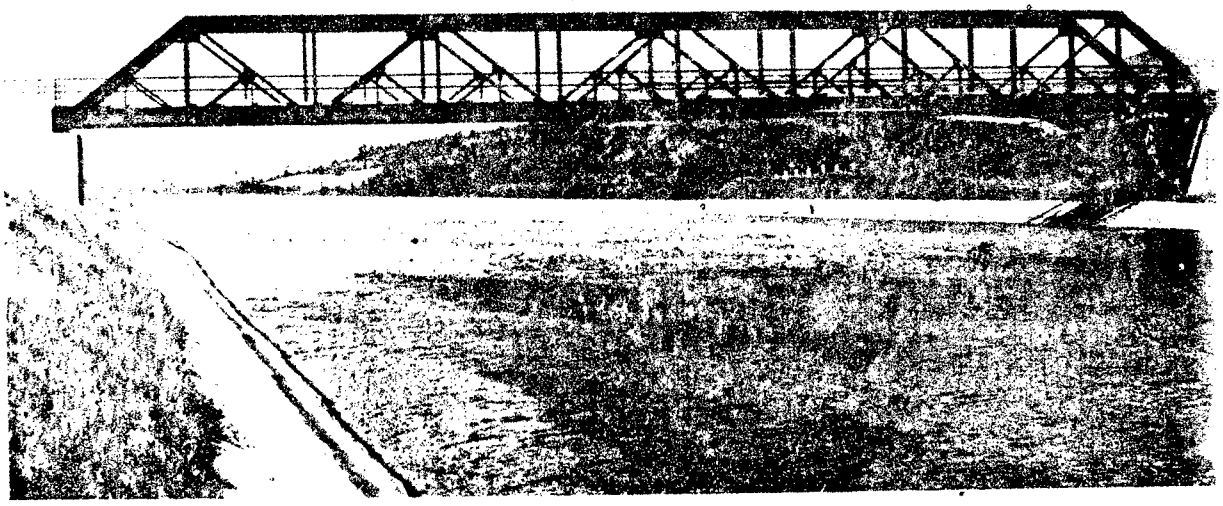
The Hricov Hydroelectric Power Plant discharges its water into a channel which will serve as a supply channel for the Miksova after this installation is completed. The discharge channel uses the old Vah river bed near the comm nity of Marcek. The bottom of the channel does not reach to the rocky ground below the alluvial deposit of the Vah. It is 30 meters wide and about 7 meters deep, with a capacity of 500 cubic meters per second. The inclination of its banks is 1:2.75. Its width at water level is 68 meters. The uniform inclination makes possible a full mechanization of the earth work. The portion of the banks affected by the fluctuation of the

PICTURES OF TYPICAL WATER POWER INSTALLATIONS

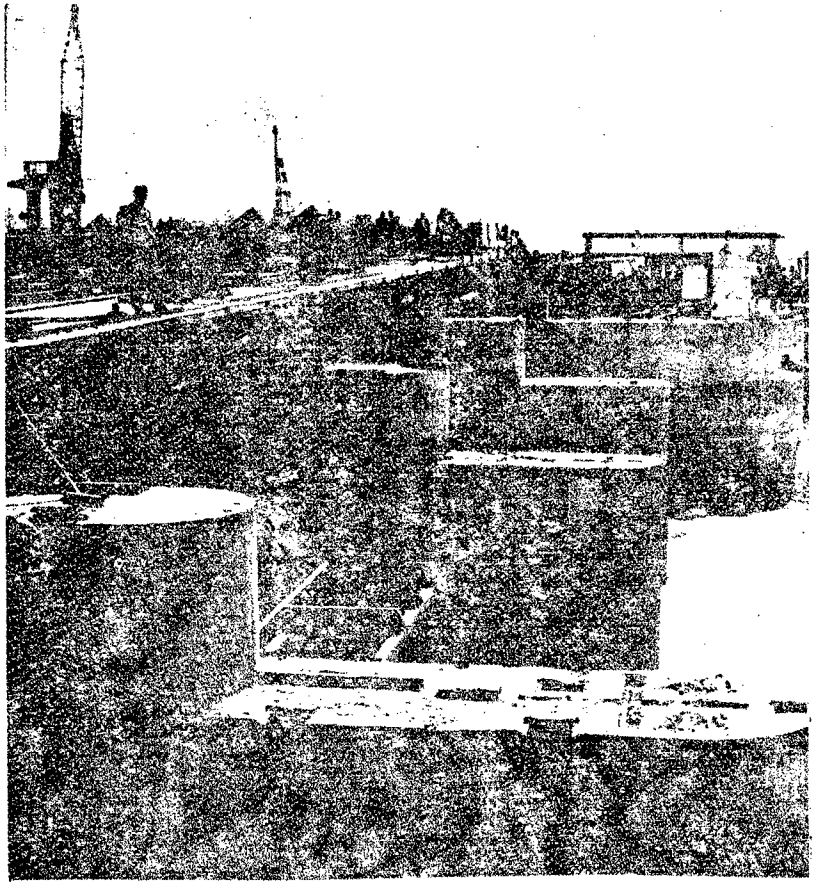


Hydroelectric Plant in Kostolna

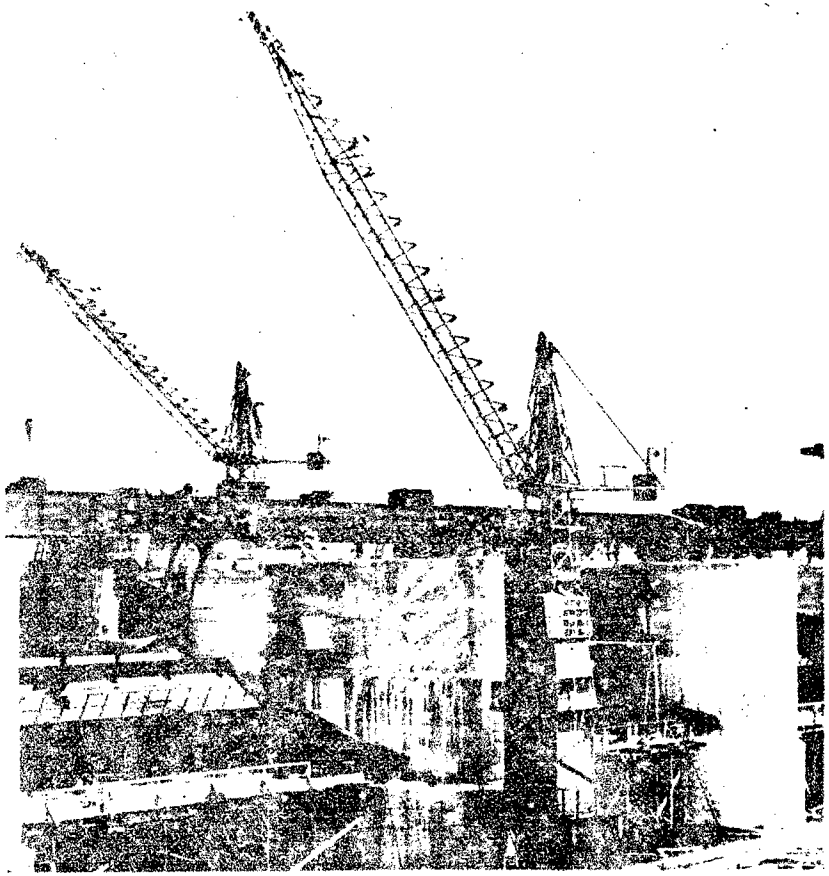
Supply Channel of the Hydroelectric Plant in Kostolna



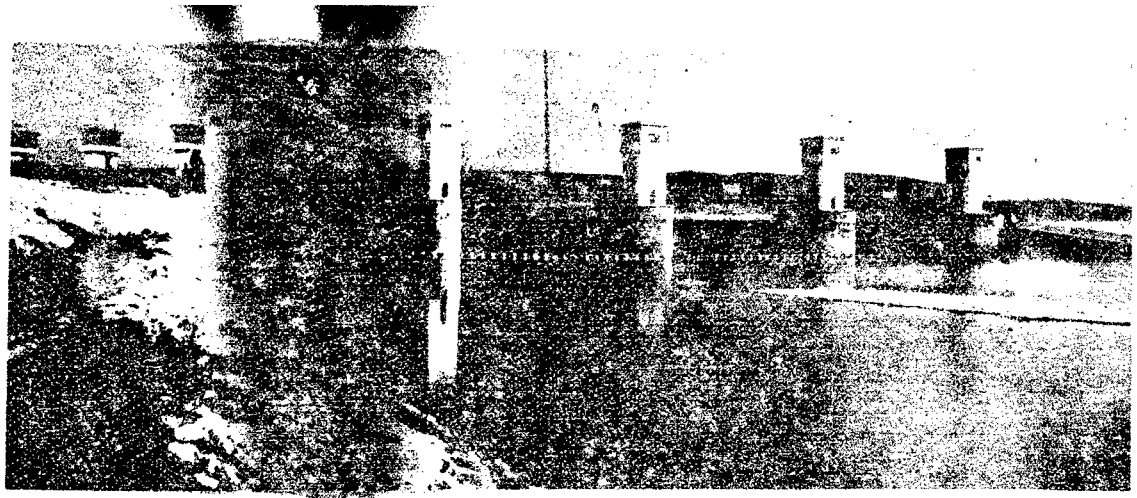
Supply Channel of the Hydroelectric Plant in Nove Mesto nad Vahom



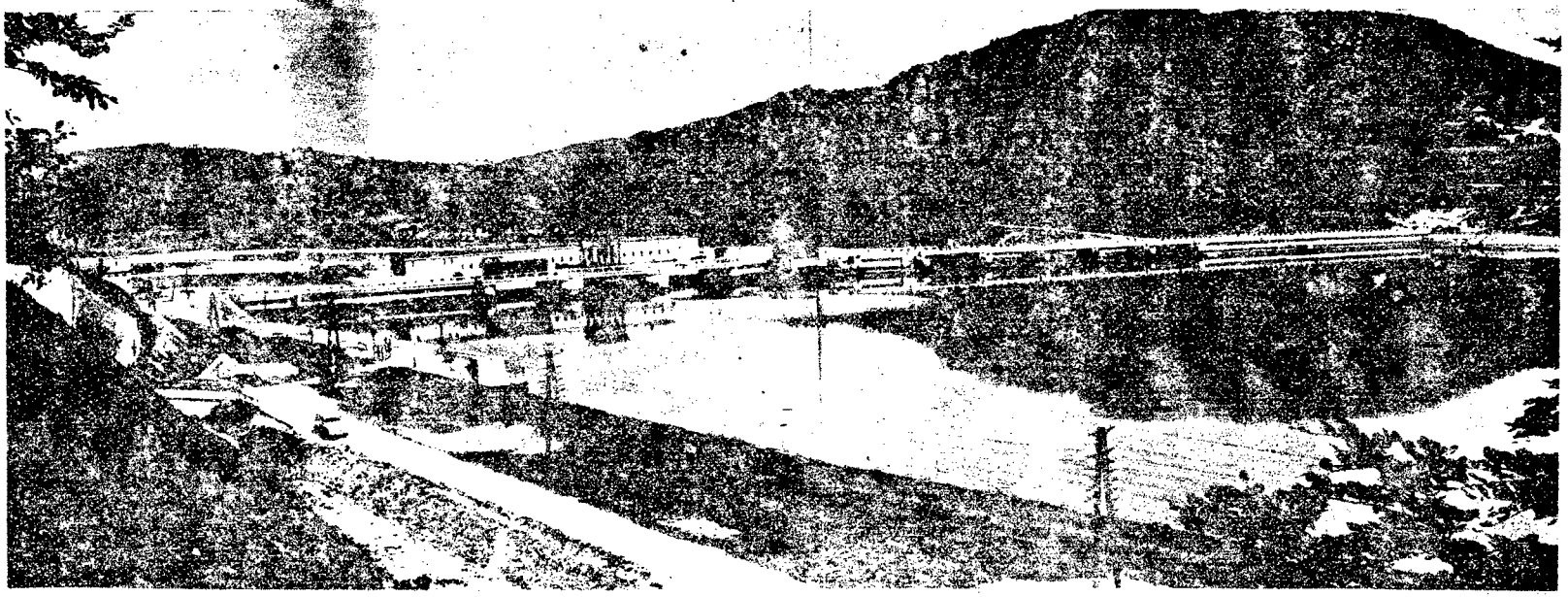
Madunice Hydroelectric Plant,
Channel Supply Installation



Drahovice Weir, under construction



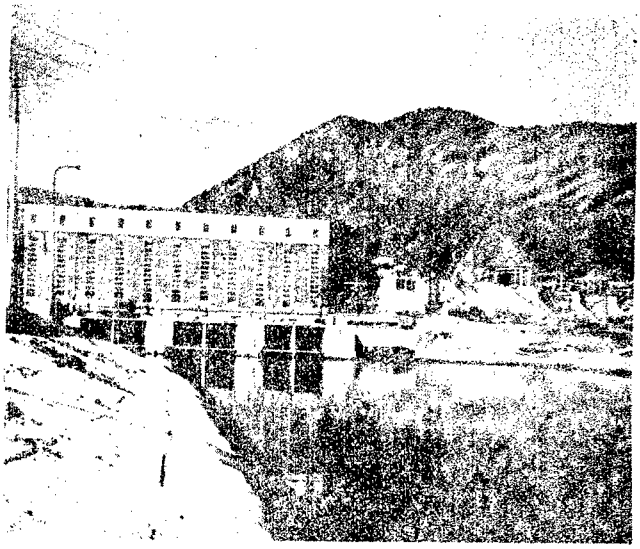
Trencin Weir--
View from below

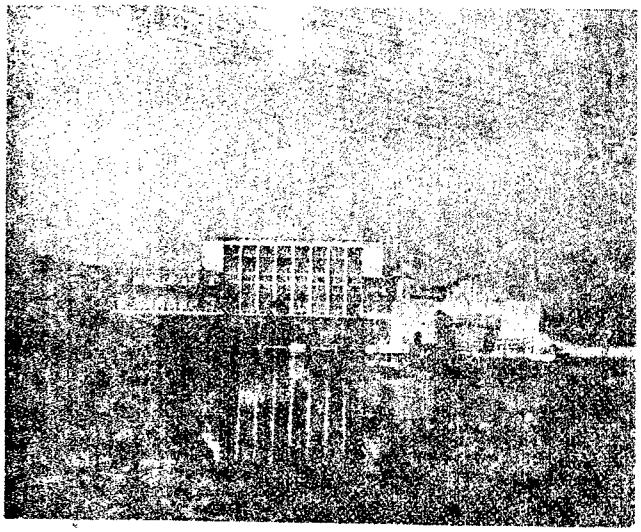


Nosice Water Power Installation--View from above

(Right)

Krpelany Water Power Installation--View from below



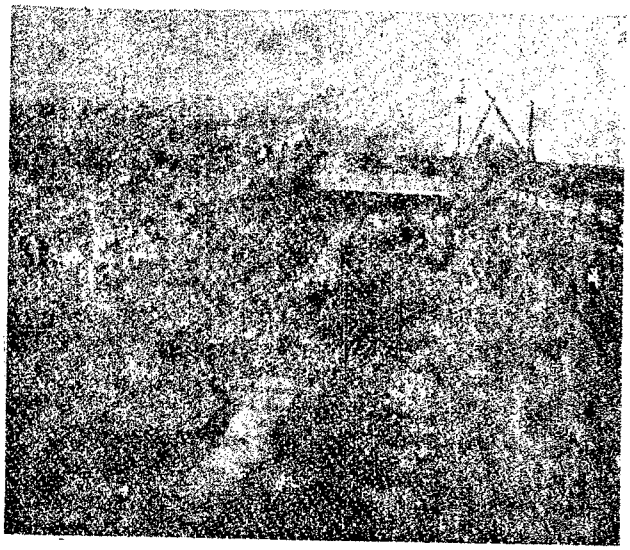


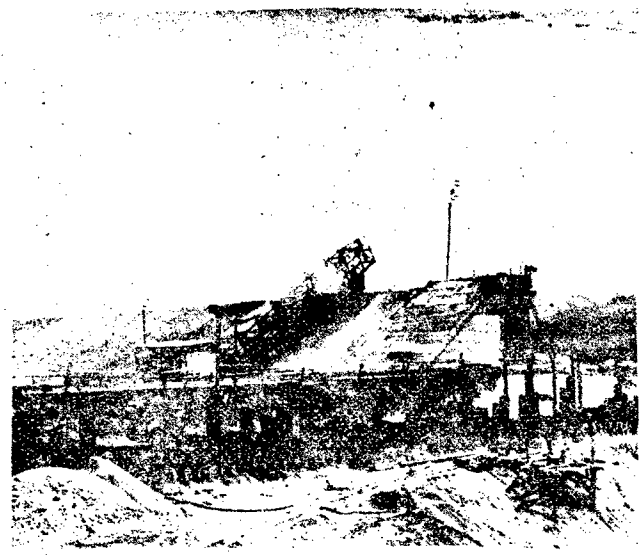
(Left)

Nove Mesto nad Vahom Hydroelectric Power Plant

(Right)

Skalka Hydroelectric Power Plant--Locks



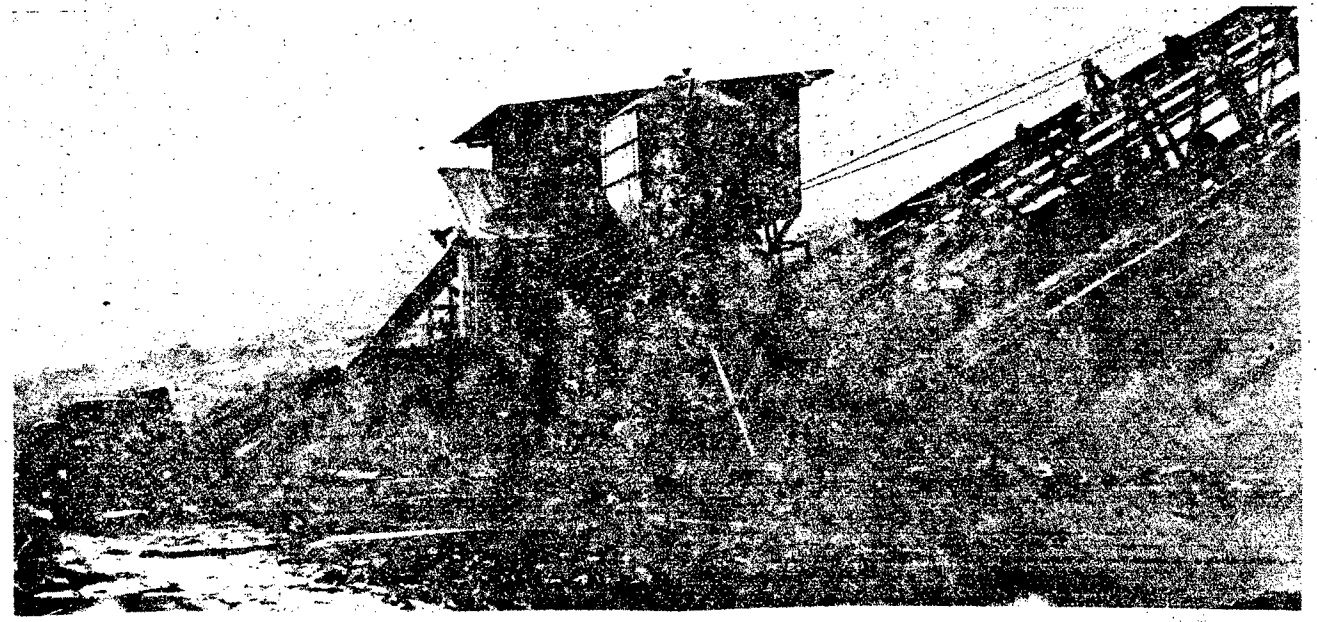


(Left)

Madunice Hydroelectric Power Plant--Concreting the Channel

(Below)

Concreting the Supply Channel of the Liporec Hydroelectric Power Plant



water level will be protected by an asphalt-concrete mixture; its low roughness coefficient will profide for more advantageous hydraulic conditions than has been the case with stone banks of the Vah River canals.

It will be necessary to build a provisional opening of the channel into the river during the construction. The proposed design differs from the seven similar arrangements made during the construction of other power installations on the Vah River. The previous provisional installations had a device that kept the water during the provisional performance at the level that would be the lowest level during normal permanent performance. It was necessary to build a dam heavily protected because it was under a considerable stress caused by the water jet. The provisional opening into the river at the Hricov power plant has no dam. Therefore, the hydrostatic level is 2.5 meters lower than the lowest level during the future permanent performance. In order to prevent cavities, the new design requires more careful starting of the hydroelectric power plant. The individual aggregates should be started with only 40 percent of the normal turbine intake. The level will then gradually be lifted to its proper heights. The starting time of an aggregate will be about 20 minutes longer before it reaches full performance. The time will be substantially shortened when two aggregates are started simultaneously. In starting three aggregates simultaneously, the proper water level would be reached by a surge wave so that it would be possible to start them at full capacity. However, the starting of all aggregates at once at their full capacity would damage the river bed, and it will therefore be necessaty to start them at only partical intake (not more than 40 percent). With only one aggregate operating, there is no danger than the water level below the power plant will cause cavities. By utilizing these circumstances, the construction cost of the provisional opening has been reduced to a fraction of the cost based on the old method. The difference between the old and new method in the Hricov case is 5.9 million against 0.7 million koruny.

The construction of the Hricov water-power installation, the first of the Hricov-Miksova-Povazska Bystrica system, requires the relocation of the two-track railroad of the 4.9-kilometer section between Horny Hrico and Strazov. It will also be necessary to relocate state highway 18 between Horny Hricov and Strazov for a length of 4.2 kilometers. The new and the old highways will be linked yy a road overpassing the railroad in Horny Hricov. The link will be 534 meters long.

The relocation of the highway and railroad will eliminate the level crossing in Dolni Hricov and Strazov and thus improve the traffic conditions on highway 18. Since the construction of the relocated highway and railroad near Prikrik Hill is difficult, the traffic will be temporarily redirected by a temporary bridge below the dam on the right bank of the Vah valley to highway 507.

It will also be necessary to relocate highway 507 on the right bank for a length of 3.1 kilometers between Marcek and Divinka, because it will be flooded. Besides that, it will be necessary to relocate telephone lines and 22 kilovolt electric power lines.

The construction of the Hricov power installation will also cause the relocation and improvement of several communities. It will be necessary to relocate eleven settlements in Divinka and 19 settlements in Strazov. Water wells in Strazov, Horny Hricov, and Marcek will be affect by the higher or lower water table caused by the construction. Therefore, new water supply installations will be built in the above communities within the framework of the whole development. A new sewage system is being built in Strazov and Hricov.

Twenty-eight dwelling units are under construction in Horny Hricov for employees of the power installation. Unlike previous cases, they will be located directly in the community not at the power installation itself. This arrangement will provide more opportunity for the families to integrate into the public and social life of the community while the employees work at the installation.

The Miksova Water-Power Installation

Temporary Structure

The social installations of the construction site will be built near Miksova. Some units, such as a kitchen with a dining room, will be made of brick and will become the house of culture for the whole community. Other parts of these installations, such as dwellings, laundry, first aid, and administrative buildings will be demolished.

The operational installation has the following units: a sorting installation combined with a washing installation with a capacity of 2 x 20 cubic meters per second, concrete mixing plant B 640 of the Stavostroj [construction enterpris with a capacity of 40 cubic meters per hour and two 500-ton cement silos. Concrete will be transported to the construction site by a cable crane with a 5-ton lifting capacity. The construction will require a total of 300,000 cubic meters of concrete.

Besides the main units there will be, as in Hricov, offices, workshops, garages, laboratories, and other units necessary for the construction.

Permanent Structures

The Miksova Hydroelectric Power Plant (Figure 6), with a normal operational head of 23.20 meters, is the highest ste

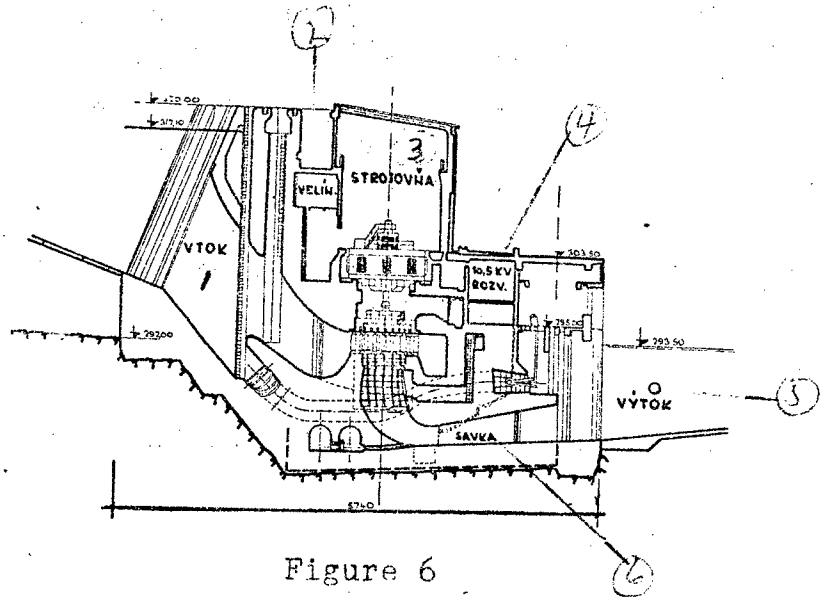


Figure 6

Miksova Hydroelectric Power Plant

1) Inflow
2) Control room
3) Machine room
4) 10.5-kv switch room
5) Outflow
6) Intake

of the whole system. It has three turbines with an intake of 3 x 168 cubic meters per second. The maximum head is 24.30 meters, which makes it possible to reach an installed capacity of 97 megawatts for all three aggregates--i.e., more than the total capacity of the other Vah River system (Kostolna-Nove Mesto-Horna Streda). The average annual output is 208 million kilowatt hours.

Characteristics of the Turbines

Diameter of the running wheel	4,800 millimeters
Revolutions	125 per minute
Continuous [priebezne] revolutions	350 per minute
Performance of the turbine at an intake of:	
400 cubic meters per second	90 percent
500 cubic meters per second	88 percent
Inertial mass GD^2	6,400 tm^2
Time for closing the turbine	5 seconds
Time for opening the turbine	10 seconds

The bearing of the generator is mounted on a radial steel structure; the exciter will be separated from the generator. The capacity of the generator is 39,000 kilovolt amperes at $\cos \varphi = 0.8$. The 10.5-kilovolt switch room is located above the intake. The 10.5/100 kilovolt block transformers, with an output of 40 kilovolt amperes, are located above the switch room. The switch house receives current transformed to 100 kilovolts.

The reserve outlets of the hydroelectric power plant are pipes located in the turbine blocks. This arrangement permits water ejection during the repair of one of the turbines by maintaining the full capacity of other power station on the derivation channel. As in Hricov, these outlets make possible the synchronization that prevents the creation of surge waves when the turbines are shut off; this is especially important for navigation. Ice usually melts in the channel; therefore no special installation for ice flow is envisaged for this unit. The Miksova Power Plant will be under remote control from the central control room in Hricov constructed for the whole system.

The 100-kilovolt switch house is located at the left side of the power station. Its capacity is 3,500 kilovolt amperes, because a 220-kilovolt switch house will be built in Povazska Bystrica. The current from Miksova will be transmitted to the 100-kilovolt switch house in Hricov as well as to the

100- and 200-kilovolt switch houses in Povazska Bystrica and will be then transmitted through a 220-kilovolt line to the main supply point in Bystricany.

The Hricova-Miksova channel is 16.4 kilometers long; it consists partly of the discharge channel, which is not watertight, and from the supply channel protected by concrete.

The discharge channel is 30 meters wide; the inclination of its banks is designed uniformly at 1:2.75 to permit complex mechanization. The banks affected by the fluctuation of the water level are protected against erosion by an asphalt-concrete mixture. Erosion is caused by waves generated by wind and a suddent start or stoppage of the plant. In addition, there will be waves caused by navigation in the future. The use of asphalt instead of stone improves the hydraulic conditions of the discharge channel. The asphalt-concrete mixture has a more favorable roughness coefficient (n = 0.012 to 0.015) than stone, which has a coefficient of 0.04. The channel is so designed that it does not cut into the rocky ground and the water level is maintained not much below the terrain in order to prevent the drying out of agricultural land.

The supply channel is now 26.0 meters wide; the concrete bank inclination is uniform for the whole channel (1:2). The crest of the dam is 3.8 meters wide, and the outer wall of the dike has an inclination of 1:2 to 1:3, according to the height. The Hricov-Miksova channel differs from other channels on the middle Vah River in that it utilizes the configuration of the terrain. While other channels of the Vah River Valley have high dikes, the Hricov-Miksova channel is located on a higher terrace which is sometimes 20 meters above the level of the valley before it reaches the Miksova power plant. The watertight layer of the banks wil, be mostly 13 centimeters; only in places where the channel crosses a deep brook valley will it be 15 centimeters. Holes will be tightened by a tested method using rubber.

The heights of the protective layer are calculated by a new method. The calculation is based on the assumed water level during the winter operation when conditions in the channel are the most favorable. The protection is proposed for 50 to 80 centimeters above this level. It has been proposed to raise the level by 50 centimeters during freezing temperatures, because the frozen channel does not require protection against waves caused by wind. This arrangement will not reduce the capacity of the frozen channel.

In order to prevent losses, a new manipulation method has been proposed for the channel with water levels that would permit peak performance of the power plant, as well as automation of all three hydroelectric power plants. The supply channel differs from the other channels especially in the composition of its dikes, which are predominantly of earth in contrast to the usual gravel.

The Staroviec Reservoir

The Stiavnik Brook crosses the channel just above the Miksova Hydroelectric Power Plant. The water level in the channel is 19 meters above the brook bottom. For reasons of economy, the valley of the brook is blocked by the left bank of the channel; Stiavnik Brook forms a reservoir which a capacity of 2.4 million cubic meters of water. Since the reservoir is very close to the Miksova Power Plant, it can serve as a means of reducing the surge waves in the channel during the sudden start or stoppage of the plant, which is important--especially for automation.

An outlet is under construction with a capacity of 90 to 100 cubic meters per second for the water of the Stiavnik Brook and its reservoir. The dam across the brook valley has an inclination of 1:2 above the water level, 1:25 down to 9 meters below the water level, and 1:3 to the bottom.

The outer wall has an inclination of 1:1.5 to 5.5 meters below the crest, 1:2 to 10.5 meters, and 1:2.5 on down to the bottom.

The dam is of earth material and is protected on both sides by a reverse [obratenyy] filter. It is grounded in the watertight ground by two methods: in places where the watertight ground is not deep it is sunk directly into it. In places where it is deep, the protective layers are tightened by a Larssen membrane, on which the earth bank is based.

The derivation channel crosses twelve brooks on its right side between Hricov and Miksova. They are Marcek, Dlhopolsky, OBlazovsky, Roviansky, Upper and Lower Hlinicky, Petrovicka, Vapenny, Jablonovsky, Bytciansky, Predstarovecky, and Stiavnik.

The local communication network will be affected by the Hricov-Miksova channel. In order not to interrupt communica-

tions, the following relocation of roads and bridges will be undertaken between Hricov and Miksova: the bridge across the channel in Oblazova, relocation of highway 507 in Kotesova and of highway 18 in Bytca, and relocation of the Bytca-Psurnovice, Mala Bytca-Miksova, and Starovec-Hvozdnica highways.

Communities where the water table will be affected will get a new water supply system. They are the following: Kotisova, Bytca, Mala Bytca, and Miksova. Sewage systems are built simultaneously with the water supply systems.

A number of electric power lines must be relocated as a results of the Miksova water power installations. The line installed for construction purposes will also be used for the adjacent communities. The obsolete 6-kilovolt lines to the more remote valleys of the individual brooks will be made into 22 kilovolt lines.

The Povazska Bystrica Water-Power Installation

Temporary Structure

The social installations of the construction site are being built together with utility buildings next to the access road to the hydroelectric power plant; they will include housing for workers and employees. Part of the social installations (12 dwelling units) are under construction within the framework of the Nosice water-power installation. The town of Povazska Bystrica is interested in the temporary social installations, and it hopes to use them for its own purposes after the construction is completed.

The operational installations of the construction site are divided into utility and investment units. The utility units are offices, workshops, garages, and storerooms; they are included in the general cost.

The investment installations contain the following units: a sorting and washing installation, a crushing plant with a capacity of 40 cubic meters per hour, a Soviet concrete mixer of the S 221 type with a capacity of 32 cubic meters per hour, concrete transportation equipment, cable cranes of the Wolf type, and assembly equipment.

Concrete will be hauled by a cable crane with one stable and one mobile tower and by the Wolf cranes. In order to cover the whole field, the stable tower will be installed on 5-meter high concrete supports and the mobile tower on a 3-meter embankment; the towers will be 32 meters high.

Permanent Structures

The Hydroelectric Power Plant in Povazska Bystrica (Figure 7) is located at the 24.8 kilometer point of the channel in the flood area of the Vah River valley. It is located on hard impermeable slate, so-called Puchov marl, covered with 8 meters of coarse alluvial deposits.

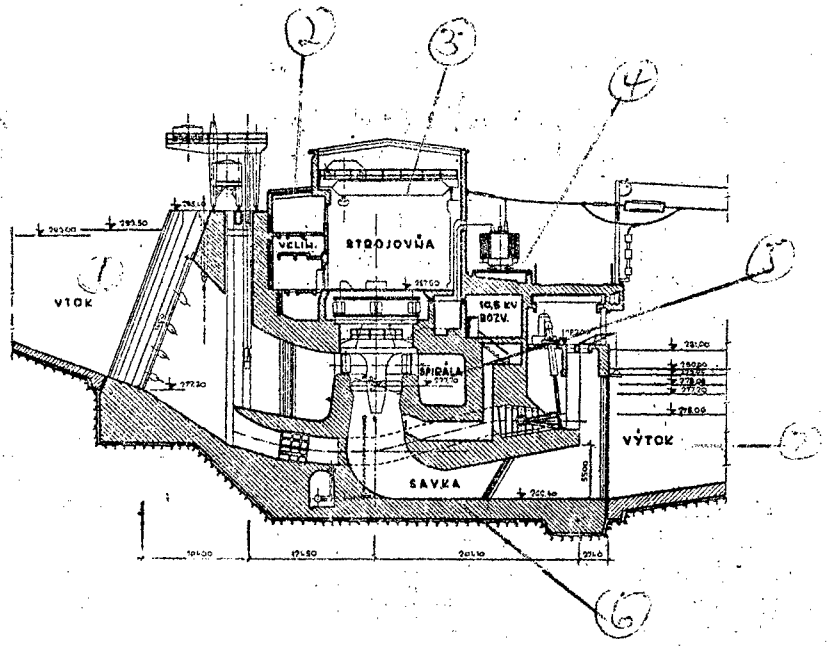


Figure 7

Povazska Bystrica Hydroelectric Power Plant

1) Inflow
2) Control room
3) Machine room
4) 10.5-kilovolt switch room
5) Spiral
6) Intake
7) Outflow

The power plant has three turbines with an intake of 3 x 168 cubic meters per second. The turbine blocks are 19 meters wide and 50 meters long.

The maximum head is 16.50 meters between the points 227 and 293.5 meters above sea level. Despite the fact that the lowest operational water level in the Nosice reservoir is 275 meters above sea level, it has not been taken into consideration in designing the installed capacity because the water level below the plant is 277 meters above sea level when one aggregate is operating.

The reserve outlets in each block will be 2,800 million meter pipes with a capacity of 75 cubic meters per second. The outlets are controlled by segment locks which are synchronized with the turbines; when a turbine is shut off the segment is opened automatically.

Characteristics of the Turbines

Total installed capacity	54.2 megawatts
Diameter of the running wheel	5,000 millimeters
Revolutions	107 per minute
Continuous revolutions	300 per minute
Performance of the turbine at an intake of:	
400 cubic meters per second	90.7 percent
500 cubic meters per second	88.4 percent
Inertial mass GD^2	3,900 tm^2
Capacity of the generator at cos φ = 0.8	23,000 kilovolt-amperes

The thrust bearing is placed on a conical base which permits the transmission of the stress directly to the solid concrete foundation of the plant by means of the stationary blades of the guide wheel of the turbine. The 10.5-kilovolt switch room is located, as in Hricov and Miksova, above the intake. Above are the 10.5/100 kilovolt block transformers with a 25 kilovolt-ampere capacity. The generators and transformers are being supplied by the V. I. Lenin Works (Zavody V. I. Lenin) in Plzen, and the turbines by the CKD [Ceskomoravska-Kolben-Danek] in Blansko. The Povazska Bystruca Hydroelectric Plant, like the Miksova plant, will be uneer remote control from the central control room installed for the whole system in Hricov.

The 100-kilovolt switch house is located on the right bank of the discharge channel some 120 meters from the plant. It has been designed for a capacity of 3,500 kilovolt amperes because it will be linked to the 220-kilovolt Povazska Bystrica switch house. This is the first time that such a high capacity is being built in the 100-kilovolt switch houses of a water-power system in Czechoslovakia. It is a joint design by Hydro-project in Bratoslava, Energoprojekt in Prague, and the Electric Power Research Institute (Energeticke vyskumne ustava) in Brno.

Power produced by the Povazska Bystrica plants is fed to Hricov and Miksova as well as to the 220-kilovolt Provazska Bystrica switch house, from where it is further transmitted by a 220-kilovolt line.

The channel between Miksova and Povazkla Bystrica is 8.24 kilometers long. It consists of the discharge channel, which is not watertight, and the concrete supply channel.

The profile of the discharge channel is the same as in Hricov--i.e., 30 meters wide at its bottom with a 1:2.75 inclination of its banks. The area of the banks affected by the water-level fluctuation is protected against erosion by an asphalt-concrete mixture made of limestone or Dolomite chips dried at 150 degrees centigrade and enveloped by natural asphalt. The better utilization of the asphalt concrete mixture in Miksova is justified by its smaller losses in the channel. The bottom of the discharge channel below the Miksova power plant has been designed so as to prevent its sinking into the rocks as much as possible. The water level is about two meters below the terrain, which prevents the drying of agricultural land and permits an economical utilization of the excavated channel profile.

The supply channel is 26 meters wide at its bottom, and the inclination of its banks below the concrete layer are supposed to be 1:2. The conditions of the supply channel are similar to those of the middle Vah River channels; it is located in the Vah River alluvial forest. However, its design is substantially different. The grade line of its bottom has been chose so as to touch the ground gravel layers and to eliminate the replccement of earth by gravel material. The dredged topsoil is put into the inner core of the channel banks; this arrangement saves a supply of about 900,000 cubic meters of gravel, which is in short supply at this section of the Vah River.

The crest of the dike is 1.7 meters above the highest water level and is 3.8 meters wide. On the outside its inclination is 1:2 up to the 9 meter heights and 1:3 below 9 meters in places where it is higher.

The channel dike on the river side serves simultaneously as a dike against floods and is protected in the concaves up to the level of 100 of annual [rocni] water, and in the convexes 50 centimeters below the level of 100 annual water [sic].

In places where the channel is located on a slope (in the Benov area) below the terrain, it is moved 100 meters from the slope in order to prevent slides. In general, the channel is located in the Vah River alluvial deposits, whose ground consists mostly of Puchov marl, Orlov sandstone, or Upohlava layers of agglomerate rocks, marl, and sandstone. These rocks form part of the Bradlo envelope of the Middle Cretaceous formation. The channel uses the old Vah River bed below the Miksova Power Plant; there it is widened, thus expanding its accumulation capacity and reducing its losses. Concrete protection of the bottom and right bank of the supply channel is omitted between the 18.5 and 19.7 kilometers points. Instead, a protection of the left bank is being proposed based on the ground composed of above-mentioned rocks.

The discharge channel leads to the Nosice reservoir; this is designed so as to prevent head losses and to permit navigation during a fluctuation of the Nosice reservoir level between the points of 280 and 277 meters above sea level. The channel is on the right bank of the Vah River. It crosses an offshoot of the Cenozoic (cenomansky) Orlov sandstone near the Orlov bridge. Immediately below the power plant it cuts into spherosiderite slates.

Its longitudinal profile is designed so as to keep the channel from cutting into the rocky ground as much as possible.

The inclination of its banks in its cross section profile, except for a narrow section near the bridge, are being proposed at 1:3 up to 4 meters from the bottom and 1:2.5 up to the terrain level. The width of the channel above the bridge is 35 meters; the channel is made wider above the rocky ground in order to reduce losses by a small volume of excavated rocks.

The discharge channel is being constructed at a time when the Nosice reservoir is full; this makes the situation more

difficult and requires more pumping of water. In order to reduce this, the channel is divided into smaller sections by cross dams.

The construction of the Miksova-Povazska Bystrica channel must be accompanied by the regulation of the right-bank tributaries of the Vah River consisting of five small streams, including the Miksova Brook. In order to avoid separate regulation of the individual ravines, the brooks are being caught by a lateral channel below the right-bank slope; the lateral channel carries the water of all brooks to the discharge channel at one spot, where it is widened in the old river bed.

The construction of the water-power installation also includes the regulation of the Popradno and Popradsly brooks, as well as the relocation of highway 507 between Sebestanova and Podhradie, also caused partly by the construction of the Nosice water-power installation.

The fact that the channel crosses the Vah River bed below the Miksova power plant requires the relocation of the river for a length of 3.08 kilometers. The relocation is being designed for a flow Q = 1,000 to 1,200 cubic meters per second. Floods will be discharged into the flood area. As in Hricov and Oplazova, the river bed is not dredged for its entire width; part of it will be washed away by floods during periods when the Nosice reservoir is opened to prevent the formation of deposits. The washing away will start in this section of the river at a flow of 500 cubic meters per second. The capacity of the power plant is 500 cubic meters per second; it will therefore take one half of the 1,000 cubic meters per second (when Nosice reservoir is opened), and in this way the Nosice reservoir will be prepared to let the washed material through. This method has reduced the original excavation plan by roughly 400,000 cubic meters of earth.

The Povazska Bystrica power installation will include a residential area being built in Povazske Podhradie and Orlova, besides 24 dwelling units. It will be equipped with a water supply and sewage system whose dimensions will permit it to serve the whole community.

The 24 dwelling units are being constructed in Povazska Bystrica, which will facilitate the integration of the families into the community life; the installations where the employees will work are 1.5 kilometers away.

It will also be necessary to relocate telephone and electric-power lines in Povazske Podhradie. The 22-kilovolt temporary line erected for construction purposes will be utilized by the adjacent communities.

The entire water-power installation system will require the movement of about 11 million cubic meters of earth and use 570,000 cubic meters of concrete; it will be completed within six years according to a harmonogram approved by the government. The Hricov Power Plant will start supplying power by the end of 1961, the Miksova and Povazska Bystrica plants by the end of 1962.

The project designing agencies, the investor, and the Vahostroj and Hydrostab enterprises are using the most advanced methods, thus shortening the construction time and reducing the cost.

2050

CZECHOSLOVAKIA

Economic and Administrative Reorganization of Czechoslovakia

[This is a translation of an article written by J. Macek and T. Pejčoch, published in Hospodářské noviny, No 47, Prague, 20 November 1959, Page 1, CSO: 3674-N]

Economic Regions and their Problems

During the past few days the Central Committee (Ústřední výbor) of the Party has proposed for nationwide discussion the question of the territorial and administrative reorganization of our republic with the purpose of bringing it into harmony with the economic development of the separate regions. We therefore consider it appropriate to explain certain principles that influence the planning and direction of the national economy according to regions.

The distribution of material production on the territory of every state is not subject to human caprice, but to laws determined by the development of the forces of production, this distribution being not unchanging, but developing and changing in accordance with the degree of development of society.

The development of technology and of the economy continually leads to greater concentration of production, to specialization, and to the cooperation and combination of the largest enterprises, whose ties extend beyond the borders of industrial centers and even beyond the borders of economic regions. For this reason the division of the state into economic regions is not unchanging and given once and for all. Together with the development and growing specialization of the individual branches of industry and agriculture, the construction of new industrial enterprises, the construction of railway lines, etc., sig-

nificant changes occur in the structure of the branches of the economy of every economic region and in the proportions and relations between regions, together, as is self-evident, with changes in the borders of the regions. The network of economic regions established with regard to the perspectives of development of the regions may not, of course, be changed too frequently, as such frequent changes disturb the relations between enterprises and branches of production.

Economic districting is that part of national economic planning which studies the rational geographic distribution of labor among the individual parts of a socialist state.

A socialist state, utilizing objective economic laws, performs economic districting in a planned manner and thus exerts an influence on the specialization and complex development of the individual districts. An economic district is the scientific organization of a territory, a system of rational territorial economic distribution of labor among the individual parts of the state in the interest of increasing the productivity of social labor.

In establishing the borders of economic regions, consideration must first of all be given to natural conditions and resources, the size, density, and distribution of the population, the level attained by the forces of production, the transportation network, etc. Within the borders of economic regions the potentialities for specialization and complex development of the economy must be ascertained.

An economic region is a specialized economic and territorial whole included within a nationwide system of territorial distribution of labor. As an objective economic category it has great theoretical and practical importance. It is defined by the following pair of basic characteristics:

1. specialization within the framework of the national economy, and
2. complex development ensuing from the specialization.

Specialization in this sense means the participation of a given economic region in the nationwide territorial division of labor, i.e. the manufacture of those products for the other parts of the territory of the state that can

most appropriately be manufactured just in the given region. Complex development means the ensuring of the necessary conditions for the uninterrupted planned growth of the branches typical for the region, as well as the profitable and total utilization of all the other potentialities and resources of the region. This complexity and the development of the other economic branches must, of course, be subordinated to the development of the main branches of the economy of the region.

From what has been said above, it results that an economic region is an objectively existing territorial economic whole that forms an organic part of the national economy. In accordance with the growth of the known potentialities for utilizing the natural and economic resources of the region, the development of technology, and the mastery of new techniques of production, the level of its economic development rises, a more complex structure of production is created, its specialization expands, its relations become more complex and qualitatively change.

Even upon the relatively small territory of our state, there exist several quite distinct natural economic regions that have arisen in the process of historical evolution, e.g. the Prague or better the Central Bohemian region with its highly advanced machine construction, or the Ostrava district with its mines and the organically connected huge metallurgical industry.

The uninterrupted development of the forces of production, changes not only in the interregional, but also in the nationwide direction of movements of transportation, and not last of all the rise of a socialist system on a world scale are fundamentally changing the conditions for the rise of new economic regions. At the present time there is thus emerging, for example, a new industrial region in Eastern Slovakia, where the East Slovak Iron Works (Východoslovenské železárny) are being constructed, on the basis of imported Soviet ore, Ostrava coke, and local sources of heat-resistant materials and limestone suitable both for metallurgical purposes and for the manufacture of lime and cement.

The economic region as an objective whole has existed always. In every social formation, however, it has been characterized by special features. The economic region of today is characterized by marked and ever growing specialization, and has for this reason extensive intra-regional and external ties that continually expand with the devel-

opment of specialization. In every economic region there are one or more great industrial centers, which form the core of the region and have a decisive role in its economic development. The relations of such centers with the surrounding territory of the region and their relations with one another are very important and their scientific analysis renders possible the objective delimitation of the borders of the economic region.

Czechoslovakia, as a highly advanced industrial nation, will not in the near future have any typically agricultural region with no industry. Insofar as such regions have existed, particularly in Slovakia, they are rapidly being raised to the level of the industrialized ones.

Under our conditions agricultural production is on a greater or lesser scale subordinated to the dominating role of the industrial centers. The economic regions ought under our conditions to become self-sufficient in basic agricultural produce. Corresponding to the extent of agricultural production should be the capacity of the food industry to manufacture basic food products of mass consumption.

The economic regions ought to be self-sufficient also in the basic production of building materials, as far as possible beginning with the manufacture of current brands of cement, which is the basic material for modern construction, and in the production of the other, particularly the lightweight building materials by utilizing local resources.

Between the existence of natural economic regions and the territorial and administrative organization of the state there exists a close connection. The administrative system of a socialist state is founded upon the unity of political and economic direction. Involved in the huge organizing role of a socialist state is the endeavor to achieve maximal proximity of the territorial and administrative organization of the state to the economic base, i.e. to the natural economic regions.

This principle, understandably, applies also to the Czechoslovak Republic. And in our country it must be respected all the more as our territorial organization of today has been completely surpassed by the evolution of our society.

The intensification and expansion of socialist rela-

tions of production, in connection with the transfer of almost the entire productive base to social ownership, lawfully requires the transfer of a considerable part of the activity of direction "down" to production. This is the factual, material cause of the need to accommodate the boundaries of the territorial and administrative wholes to the natural boundaries of the economic regions, which are self-evidently considerably greater than the presently existing krajs. The political side of the measures to be carried out thus lies in the fact that the strength and firmness of our social order, which has its basis in joint socialist ownership of the means of production, makes it possible to leave a large share of the direction of production and of the sectors of social consumption to the elective organs of the people, who will in ever increasing measure participate in the administration of the state.

[This is a translation of an article written by František Vodka, published in Hospodářské noviny, No 48, Prague, 27 November 1959, Pages 1, 6, CSO: 3674-N]

On the Eve of the New Territorial Organization

Our working people have received with great interest the address of the First Secretary of the Central Committee of the Communist Party of Czechoslovakia (Komunistická strana Československa) and President of the Republic Comrade Novotný on the territorial reorganization of the organs of state power and state administration, the people's councils (národní výbory). The proposed measure, which is to replace the territorial organization of the state that has been rendered obsolete by the evolution of our society, will ensure the further intensification of our socialist democracy and substantially expand the participation of the elective organs of the people in the administration of the state. It is self-evident that all these measures will rest upon the sole possible principle of democratic centralism.

The proposed measures are a logical part of the far-reaching action of popularizing our administration and of the endeavor to decentralize authority. They are a factual continuation of the reorganization of the direction of industry, in which a considerable share of the authority of

the ministries was given over to the enterprises or to associations of them. This measure has produced favorable results in plan fulfillment, and particularly in the fulfillment of its qualitative indices.

The draft of the territorial reorganization of the state presupposes a reduction of the number of krajs and the establishment of substantially larger regions. The reorganization is not to bring about solely a reduction of the administrative apparatus, but is in particular to accommodate the territorial boundaries to the boundaries of the natural economic regions that have been created in the course of historical evolution and that are being created in the building of socialism.

Even upon the relatively small territory of the Czechoslovak Republic we may differentiate several distinct economic regions, which by virtue of their specialization are quite disparate from the remaining territory.

The Specialization of the Ostrava and North Bohemian Regions

A quite distinct specialization belongs to the Ostrava region, which has the entire output of coke-producing coal and approximately 75% of the entire national production of steel. Ferrous metallurgy is here based upon the large deposits of coke-producing coal and upon imported Soviet ore. The proximity of the metallurgical base to manufacturing at an advanced stage of development makes it possible to develop heavy engineering, in particular the manufacture of heavy constructions in Vítkovice, railway cars in Studénka, or the assembly-line production of Tatra trucks in Kopřivnice. Ostrava Kraj at present, however, does not in relation to the huge investment construction of the basic branches of industry have adequate supplies of building materials or of auxiliary ores for metallurgy, particularly limestone. Likewise the agricultural hinterland of the populous but narrow Ostrava region is within the framework of today's kraj inadequate, and the specialization of agricultural production does not correspond to the needs of the population of the industrial centers. The concentration of industry necessitates much frequent traveling from a broad territory that reaches far beyond the borders of the present Ostrava Kraj, into both Olomouc Kraj and Gottwaldov Kraj. All these circumstances lead to the conclusion that there should be a substantial enlargement of the territory of the present Ostrava Kraj, so that the new organizational unit can within the frame-

work of its territory develop the necessary internal unions and proportions to ensure the development of its main branches of industry.

A further quite distinct specialization belongs, for example, to the North Bohemian region with its deposits of brown coal. The decisive branch of industry here is coal mining, which is the point of departure for the production of electric power and the chemical processing of coal (the Stalin Works [Stalinovy závody]). The coal base is likewise the point of departure for additional branches of industry with considerable fuel consumption, e.g. the manufacture of plate glass. At the present time an ever growing portion of the output is exported from the region and consumed under boilers in industrial plants or electric power plants, often several hundred kilometers distant from the place of mining.

The rapidly growing demands of the economy for electricity and other kinds of power necessitate a considerable rise in the output of brown coal, which is practically the only domestic power fuel. The rise in the output of the North Bohemian brown coal basin will assume such an extent that it would be uneconomical and technically very difficult to transport the coal to the place of consumption by railway. For this reason the course has been chosen of processing the coal at the place where it is mined by producing either electric power or gas, which would be delivered directly to the consumer. This solution of converting the coal into electric power or gas in the proximity of the coal base will entail great savings in social costs, in giant modern electric power plants the difficult manipulation of coal in connection with its burning will disappear, and the distinct specialization of this region will be achieved.

This is a typical example of how the economic specialization of a region increases with the development of technology. On the other hand, however, such a process evokes highly complex relationships within a comparatively small territory. Complex, because in addition to the territorial production relationships of the individual branches of industry it will be necessary to find solutions for the consequences of the high concentration of industry. This will be primarily a problem of processing the waste products of the giant electric power plants, which constitute the raw materials base for construction; the conservation of water resources, which in face of the great demands of consumers

will be severely limited, the adjustment of the interests of industry and agriculture, the settlement of the labor force, etc. The necessity of accommodating the kraj to the economic region therefore ensues from the complex economi problems of the territory, which must be solved and managed from a single center.

The Economic Development of Slovakia

An example of how changing conditions call new economic regions into being is Eastern Slovakia, which in the not so distant past was the industrially most backward territory of the Czechoslovak Republic. The development of economic collaboration with the USSR contributes to the circumstance that a considerable portion of the raw materials for our industry is transported through Slovakia, their volume and weight, as for example of iron ore, constituting a great burden on transportation. To the USSR the Czech krajs export for the most part products of less volume and weight, e.g. consumer goods and machinery. A considerable proportion of the freight cars therefore return to the stations of departure empty. It is self-evident that the abolition of this wasteful and inefficient transportation policy would produce considerable savings in social labor. For this reason the decision was taken to construct the East Slovak Iron Works, which will process Soviet ore and as fuel use Ostrava coal or coke, thus utilizing the empty trips of the cars from Ostrava. For the furnace walls use will be made of the large deposits of magnesite and heat-resistant clays from local sources, just as of limestone.

This decision provided the foundation for the construction of the main item of industry in this region, which imposes the erection of a set of additional enterprises that take this as their starting point. This will lead to the rapid economic development not only of Eastern, but of the whole of Slovakia, for here there will be created the material basis for the development of all the branches of production that require the consumption of metal. In Eastern Slovakia not only are labor reserves being utilized, but significant progress is being made in raising the economic level to that of the rest of the country. It will therefore be all the more appropriate likewise to adapt the territorial organization of this region to the given economic conditions.

New Economic Centers Will Emerge

Similarly one could analyze the special position and the economic compactness of Central and Eastern Bohemia, Southern Moravia with the Brno industrial agglomeration, etc.

Territorial reorganization must not be conceived as merely the mechanical combination of two or more krajs having the same area and boundaries as they do today. The construction of new industrial plants and the expansion of existing ones will give rise to new economic centers, whose influence alters the territorial interrelationships to which the new administrative boundaries must be made to conform. To cite some examples: the growth of production in the automobile works in Mladá Boleslav understandably requires a continual increase in the labor force. A plant of such size cannot be saturated solely with local labor, but one must count upon its furnishing employment to the population from a wide vicinity, among others from the adjacent part of the neighboring okres of Doksy, which is however in Liberec Kraj.

Although this territory economically inclines toward this industrial center, it is administratively divided and administered from two mutually independent places. This causes incessant difficulties, since the labor force on this territory is reckoned in the balance of labor resources of Liberec Kraj. From this standpoint the territory is managed as though it were industrially backward, with no opportunities for employment in industry. From this also results the endeavor to locate a new factory on this territory and to do away with the "unhealthy" departure of labor to the neighboring kraj. Were a new factory to be located here, the natural hinterland of the already existing industrial enterprise would be impaired, and a disproportion would result between the employment and the supply of labor on the whole territory. In fact new economic and territorial relationships have come into being here and in their interest it is likewise necessary to revise the administrative boundaries.

A similar case is Kojetín Okres, where the representatives of Olomouc Kraj and Kojetín Okres continually submit requests for its industrialization. However, in the close neighborhood of the okres there is a set of towns with fast growing industry that requires labor power, e.g. Chropyně, Prostějov, and Přerov with their advanced industry, for which the relatively very small Kojetín Okres forms the natural hinterland. It would far better correspond to present-day conditions if this territory were

likewise from the administrative standpoint divided in accordance with its natural inclination toward these centers.

The present kraj boundaries likewise in numerous cases impair the compactness of raw materials bases, which should on the contrary be completely guaranteed from a single center. A typical example is the territory of Kadaň Okres in Karlovy Vary Kraj, into which the North Bohemian brown coal basin extends, although its dominant part lies in Ústí nad Labem Kraj. The fractioning of the coal basin into two krajs causes considerable difficulties, particularly in the planning and guaranteeing of all buildings and installations that will be disturbed by the mining or that will have to be constructed (residential areas, communications of all types, etc.).

The same applies to natural agricultural regions, where for example the Žatec hop-growing region is divided into two krajs and should on the contrary be directed from a single center.

These few examples show that in drawing the boundaries of the new economic regions, decisions will have to be made in certain instances to dismember not only krajs, but also okreses, and that the reorganization of the economic regions will be solved not only from the standpoint of the economic base that has developed to the present time, but also from that of its anticipated development.

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EAST GERMANY

The GDR Merchant Fleet Goes Everywhere

[This is a translation of an article by Dr M. Schelzel in Der Aussenhandel und Der Innerdeutsche Handel, Vol X, No 8, 20 April 1960, Berlin, pages 31-34; CSO: 4144-N]

The socialist merchant fleet differs from capitalist fleets in its gradual development in the basis of long-term fleet construction programs and the planned use of ships in accordance with the amount and direction of sea-going foreign trade transport.

Ocean liner shipping has resulted as an adequate organizational form of socialist merchant marine shipping from the character of our foreing trade relations and transport. The liner type of shipping has become the predominant operational form of trade shipping through the expansion of the merchant fleets of the socialist countries. Today this tendency is already beginning to be clearly delineated. More and more new merchant marine lines are directing their ships to all parts of the world in addition to the already existing line services of the USSR, Poland, the GDR, Bulgaria, and other socialist countries.

Thus the GDR, in common with the shipping association of the UAR [United Arab Republic], ahs already taken up regular express shipping between Wismar and Alexandria. The USSR began a new liner service between Odessa and Syria with Soviet ships. An agreement was made between the Baltic State Steamship Company in Leningrad and the United Baltic Corporation, Limited, in London for a common freight service with 10- to 12-day departures between London and/or Hull and Leningrad and/or Riga. The Polish Ocean Lines expanded their USA service as of 1 January 1959 and have, by the expressed wishes of the shippers, permitted two separate services to be run instead of one combined service. Hungary's merchant fleet is opening a line to the ports of the Persian Gulf and the Czech merchant fleet from the Black Sea to East Asia. Both have connections with the Danube shipping route. The Bulgarian state line regularly travels the Black Sea Ports-Great Britain route. This list of socialist shipping lines is

by no means complete. In short, merchant ships of the socialist countries serve all world ports of significance and are sucessfully competing with the imperialistic shipping monopoly.

This development stands in sharp contrast to the present crisis situation in capitalist merchant shipping. The crisis has led to a rapid fall in freight rates in tramp steamer and tanker shipping and also has not spared merchant liner shipping. The rapid growth in tonnage and the incursion of numerous tramp steamers into liner shipping in the presence of a stagnation in the volume of world trade has resulted in an overabundance of line services and a continuous utilization of drop in the loading capacity of ships. At the same time, various shipping firms which could not cope with the murderous competitive battle have had to curtail their line traffic or completely cease operations.

Cooperational Services Are in Accordance With Our Principles

The socialist merchant fleets do not regard the capitalist shipping firms in liner shipping as merciless competitors who are striving to drive them from the shipping field and chase cargoes away from them. The expansion of our merchant shipping is traceable to the development of the sea-going foreign trade volume. In the sea shipping traffic of the socialist countries among each other, the transport of goods is carried out exclusively on the respective ships of these countries in order to avoid additional charges for free foreign bills of excahnge. In sea shipping trade with capitalist countries on the other hand, basically the utilization of one's own shipping space is granted to the foreign trade partner equally so that as a rule there results a financial balancing.

The establishment of cooperative services in liner shipping is in agreement with this principle of equality from which all socialist countries proceed in commercial shipping. Such a cooperative service has already existed for several years between Finnish and GDR ports. The business situation in Finnish shipping, which has been struggling with great difficulties on the international foreing market, has thereby been noticeavly eased as loading amounts and freight in the traffic between the GDR and Finland have actually remained uninfluenced by the crisis in the capitalist shipping market.

The Southern Levant Line of the German Shipping Office in Rostock is being operated in common with the shipping organization of the UAR, and the Societe Generale pour la Navigation Maritime, which services, besides Alexandria, the ports of Latajua abd Beirut. In both cases the principle of the greatest possible equality of distribution of cargo going in both directions holds true for the ships of the participating shipping firms.

The USSR and other people's democracies have also made agreements concerning numerous cooperative services in liner shipping with other countries. Thus, for example, there is a common line between the North Sea ports of the USSR and UAR oorts on the basis of a 50ppercent load equalization for each fleet with the use of several special ships. To the planned new line services of the Odessa State Black Sea Shipping Office belongs, besides a West Africa service which also runs to European Mediterranean ports, a regular line to the USA, which is to be operated in common with foreign interests. The increased attractiveness of these trade relations are not least of all attributable to the consistent peace policies of the Soviet Union and the general relaxing of tension and economic approach of the two great states, the USSR and USA.

The Rumanian "Romtrans" Association represents another cooperative service, here with the Indian shipping associations Scindia Neam Navigation Co., Bombay, and the India Steamship Company, Calcutta. Their ships travel regularly between Constanza and various Indian ports.

These cooperative line services represent great advantages for both sides. They make possible a greater density of sailings and expanded shipping possibilities in a regular sequence and on fixed time schedules, as well as a guaranteed utilization of one's own shipping space. A cooperative line with socialist shipping organizations also signifies for capitalist partners, even in times of crisis, bood business possibilities and greater social security for seamen of the shipping companies concerned.

Cooperative line services with socialist shipping are of especially great help in the economic construction of especially young national states. Foreign exchange rate savings and incomes in foreign trade transport play an important role for these countries, who depend more than others on the export of their agricultural products and on the import of industrial equipment. Their economic policies are directed, among other

things, toward creating their own national merchant fleet and toward shipping an appropriate part of their foreign trade commodities with their own tonnage.

Monopolies Against Young National States

These efforts have met stubborn resistance from imperialist countries who themselves have large fleets available and from several capitalistic "traditional" shipping countries. In order to maintain their shipping monopoly, they defame all measures for furthering the national shipping business of underdeveloped countries as discrimination against the flags of their countries and exert a partly open and partly concealed economic pressure. Thus, for example, Sir Nicholas Cayser, the President of the British Chamber of Shipping, demanded energetic intervention of the British Government against so-called discriminatory measures in the area of high-seas shipping in the countries under development. In the opinion of Sir Cayser, this is no longer to be done with moral pressure; now financial pressure must be imposed in the granting of credits, etc. The demands of the High-Seas Shipping Traffic Advisory Council in the Bonn Bundestag lie in the same direction, which are tantamount to a monopoly position of West German shipping companies in the transport of all goods delivered on the basis of trade and credit agreements to and from countries undergoing economic development. The shipping conferences which are ruled over by the large capitalist shipping companies also show animosity against all newcomers. They are preparing great difficulties for the shipping companies of young national states in establishing and expanding shipping line services by their monopolistic policies and are trying to damage the profitability of these lines by pressure on the shippers and through temporary rate wars.

For example, the Indian Shipping Administration filed complaints through the Indian conference that Indian ships are not granted loading rights in traffic between Ceylon and Great Britain. To be sure, the India and Skindia shipping offices have decided to service the ports of Ceylon without the consent of the conference; however, they must reckon with sharp economic measures on the side of the conference shipping companies. Above and beyond this, the foreign exchange economics of the economically underdeveloped countries will be additionally burdened by the conference tariffs, which are based on excessive monopoly shipments.

The line shipping of the socialist countries is not connected with the monopoly policies of the capitalist shipping conferences and does not strive for any monopoly position in high-seas shipping. On the contrary! It supports efforts toward independence in all states and gives numerous development possibilities to their merchant fleets through mutual shipping agreements and cooperative lines.

The CEMA Influences Shipping Line Services

In 1958 a total of 41 regular, international shipping line services were maintained by the countries joined together in the Council of Mutual Economic Aid [CEMA]; these services employed 118 ships with [a total of] 491,000 deadweight tons. Only four of these lines existed between the socialist countries, whereas all the others serviced the ports of socialist and capitalist states. The strongest development has taken place in line traffic between the North Sea ports of the socialist countries and the Northern European countries. In 1958 a total of 158,000 tons of goods were shipped by the 16 shipping lines of the USSR, Poland, and the GDR which travel these routes.

The still unsatisfactory status of the line shipping of socialist countries compelled the opening of numerous new services last year. The points of concentration here were the Black Sea-Mediterranean and/or Black Sea-Western European ports--Middle and Far East relationships in which so far a considerable part of the general cargoes of the socialist countries were still shipped by capitalist tonnage. Socialist line shipping will also be expanded this year and in the coming years up to 1965. Undertaking the following line services appears above all purposeful and urgent: Black Sea/Mediterranean (including North African Ports)-Western Europe; Murmansk-Mediterranean/Black Sea; socialist North Sea ports-West Africa; Black Sea-Red Sea/Persian Gulf.

Most of these most important shipping lines are geared to the expanded traffic relationships with the countries undergoing economic development. Above and beyond this, shipping by shipping lines between the states participating in the CEMA is achieving a growing significance. Their scope by 1965 will increase by about 3.5 times the level of 1958 on the basis of the internationally geared transport plans. It is also planned to permit as many transit shipments as possible of sea cargo belonging to the participating states to be

transported by the tonnage of lines of friendly countries. For this purpose the concrete dimensions of transit transport requirements of Czechoslovakia, Hungary, and the GDR, as well as payment conditions, must be regulated annually through agreements.

The economic policies of the CEMA will result in having the fleets of the participating countries participate more strongly in the transport of goods from and to capitalist countries. What matters here is not only adapting tonnage to the absolute growth of sea-going foreign trade but also increasing the relative share of the tonnage pf participating countries in the transport volume. The tonnage must therefore grow at a more rapid pace than the volume of sea cargoes.

Therefore, the task of liner shipping will be to increase the corresponding tonnage of the members of the council by 1965 by about fourfold in comparison to 1958 and to reach a level of about 1.8 million deadweight tons. In this connection, the merchant fleets of Czechoslovakia and Rumania will also participate in regular line shipping. Liner transport in 1965 will have a quota of about 10 million tons alone in export goods to be delivered overseas.

Let Us Attend to the Structure of the Exchange of Goods

A special problem in the cargo transport system of the socialist countries which also has an effect on line shipping is the quantative collapse in the flow of export and import goods. While in the GDR the quantative share of imports essentially exceeds the export of commodities, the reverse is true of all participating states of the council observed as a whole. The flow of export goods exceeds imports by about 200 percent because of the relatively high share of raw material and semifinished product exports of the Soviet Union to other socialist countries. Again a reversed situation is true for traffic with countries undergoing economic development. This circumstance necessitates considerable transport between foreign ports, which will amount to approximately 2.5 to 2.8 million tons. This means that shipping lines must include as many foreign ports as possible in their service and must compete more strongly in the international sea freight market.

We must get away especially from the usual limitation of shipping only general goods on the shipping lines of socialist

countries. Although the transport of general goods, now as before, will remain the strongest support of shipping line traffic, bulk goods such as coal, ore, apatite, etc. should also be delivered to a greater degree on regular shipping lines. A stable flow of goods and the elimination of seasonal and cyclical fluctuations in the traffic between friendly countries makes it evident here that we must change over to a planned and scheduled sea transport system. So far this has foundered above all on the still small number of special ships, which, however, will be basically altered in the coming years. By 1965 the line tonnage of the socialist countries is to be thoroughly specialized and will reach approximately the following composition: universal ships, 71.6 percent; timber and grain transporters, 12.8 percent; coal and ore freighters, 13.6 percent; refrigerator ships, 2.0 percent.

The tendency toward a stronger specialization in line tonnage will without doubt continue in the future. This concerns especially the increasing quota of refrigerator ships which will ship predominantly fruits from the South.

The line shipping of the GDR will also experience a rapid development within the framework of the socialist countries. This does not refer alone to increasing tonnage, which has already been reported on in detail in the periodical (Der Aussenhandel , No 16 and 17, 1959). New services will be created and existing ones expanded. Besides the lines already mentioned as cooperating with foreign shipping companies to the UAR and Finland, the German Shipping Company maintains line service from Rostock/Wismar outgoing to the North Sea ports of the USSR, to Holland and Belgium, to Albania and East Asia (People's Republics of China and Korea). These main routes of our merchant ships, which have already been established for some time, have the character of line service only to a limited extent.

In contrast to the "wild" or tramp steamer type of shipping, ships within the line service run to determined ports according to a previously set up route plan which has been valid for some time and unload goods there independently of the size of the available load. Whereas tramp shipping almost exclusively takes over closed loads--mainly bulk goods, partial loads predominate in line shipping--mainly piece goods, and, although to a smaller extent, bulk goods also. Accordingly, the line ship, which has been the piece goods and/or multi-purpose freighter in world traffic in the tramp shipping of bulk goods, is recently playing a dominating role as a special ship.

The Advantages of the Shipping Line Service

The rapid development of the world wide division of labor and the increase in the transport of goods connected with this on the high-sea routes has extraordinarily expanded line shipping. It has become the predominant operational form of international shipping and spans a constantly broadening network of shipping lines around the globe. All significant port area of the world are served by line services with whose help goods can be shipped from and to any location, either directly or by reloading. The original limition to piece goods traffic was lifted a long time ago. At the present time bulk goods and special goods as closed loadings, as base loadings, or as complementary loadings are being shipped on line ships.

The shipping of goods on line ships offers a series of unmistakable advantages:

a) Loading in agreement with delivery schedule of production and the delivery schedule of the consumer in regard to the planning of this loading;
b) a continuous shipment of smaller consignments;
c) a more rapid delivery of commodities--i.e., shorter transport time;
d) a serviceable handling of goods on board and in transshipment;
e) a greater rate continuity--i.e., shipment at fixed freight rates.

The use of modern ships equipped with the newest techniques guarantees security and rapidity of line transports. Moreover, regular line services also have available special ships for special requirements and goods. All these advantages are effective in the first place for the goods shipper, the loader, and often cause these people to give preference to lines whenever shipments are connected with relatively high transport costs. The attractiveness of any shipping lines grows to the degree that it does justice to the conditions which result from the advantages mentioned.

Although there is no tramp shipping in the socialist merchant marine in the usual sense, the high-seas shipping of the GDR offers the above-mentioned advantages only to a limited degree. The use of ships is carried out in a planned manner according to the flow of goods; however, there is seldom an exactly determined long-term route plan. The number of sailings is still insufficient, as are the number of ports to which the ships sail.

This is not least of all attributable to the still insufficient number of ships and tonnage capacity of our young merchant fleet which is still under construction. Modern line traffic requires at least on sailing per month, at the most two.

However, here we are also concerned with the least number of ships which can be employed in the sailing area. In practice, this makes a certain reserve of ships necessary, in order to be able to overcome delays or repairs of line ships. These reserves can form the tonnage which is being employed in tramp shipping.

It is our goal to condense the existing network of line shipping in the GDR and to complete the ship pool. Here we must consider which new line services are necessary on the basis of the growing stream of goods. We should consider strengthening our shipping relations with South America and West Africa; these areas will soon have great significance for us.

The development of the GDR line shipping must of course be geared to the line services of all other socialist countries, so that a coordinated servicing of all world ports is brought about by socialist ships. The cooperation of the socialist countries can and must be so formed through the Permanent Commission for Shipping in the Council of Mutual Economic Aid that this cooperation appears commonly on the freight market, that all disproportions between exports and imports are avoided, and that a maximum utilization of tonnage is obtained.

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Tasks of the Inland Fisheries in the Seven-Year Plan

[This is a translation of an article by S. Stechowsky, Master of Pisciculture, Ministry of Agriculture and Forestry, Berlin, published un Deutsche Fischerei Zeitung, Vol VII, No 1, January 1960, Berlin, pages 1-5; CSO: 3759-N]

The Seven-Year Plan sets important goals for all branches of the national economy, goals which have to be attained and surpassed by the concentration of all efforts in order to secure the victory of socialism.

Those active in fresh-water fishing face great tasks which cannot be fulfilled unless technological and scientific progress is realized in this field more efficiently than in the past.

The chief task of fresh-water fishing is a 142-percent increase of edible fish production as compared to 1958. The GDR average per hectare yields of fish hatcheries should increase from about 400 kilograms to 488 kilograms. Lake fishing will have to increase the share of quality fish in the total catches, at the same time intensifying production by adequately improving management methods.

Socialist transformation is an important precondition for carrying out the chief economic task and for fulfilling and overfulfilling the Seven-Year Plan. The example of agriculture shows best how important it is to apply the superior method of planned economy in the socialist sector. While at present over 70 percent of the lakes and rivers and more than 60 percent of the ponds are already managed by socialist fresh water fishery organizations, there are still quite a few lessees and proprietors of private fishery rights who are unwilling to accept new developments. On the basis of the experiences of the already existing socialist enterprises, it is now, first of all, imperative to convince those engaged in individual hatchery and fishery activities of the importance if their joining the socialist sector. The Councils of the Gera, Halle, and Magdeburg Bezirks should accordingly exert more influence on socialist transformation. Fishery coopera-

tives will also have to keep this matter on their agendas and to explain the importance of socialist transformation to their members. In districts where hatcheries are frequent, the necessity of an anticipated waiving of leases and of joining national fresh water fisheries should be made clear to lessees.

This path is planned for all individual hatcheries. In the southern bezirks, especially in Gera, Suhl, and Erfurt, the thousands of individual hatcheries should, in the first place, be annexed as supplementary sections to agricultural cooperatives.

In lake districts it will be necessary to convince lessees and proprietors of private fishery rights to join already existing cooperatives of working fishermen, or national fresh water fisheries.

Lake and river fishery especially needs collective management. This is shown by the primitive and obsolete methods still used by private management on the basis of its economic standing. Individually managed waters are often connected with each other and definitely call for common management in order to attain peak yields.

Fresh water fishery in lakes has the largest reserves but is also the most backward branch in this field. This is why we shall deal with this matter in the first place. The crucial problem, which is the increase in the share of quality fish in the total catches, is the transformation of management methods. The population's steadily growing requirements can be satisfied by high-grade fish only. It is therefore essential that we at once ascertain (in cooperation with our scientists) the waters where species like perch pike and moraine may be bred. On the basis of such conclusions, stocks will have to be controlled and appropriate species introduced in lakes and rivers.

Breeding organized in this way, as well as the early fulfillment of the Seven-Year Plan, calls for the planning of brood fish raising well in advance. National enterprises and cooperatives should therefore notify their increased requirements of brood fish for the next five years at the Brood Fish and Fishbreeding Center (Zentralstelle fuer Satzfischbedorf und Fischzucht). The most important task in the course of reorganization is the utilization of lakes as fish hatcheries. According to scientific tests, about 15,000 hectares of lakes in this republic are suitable for such purposes. This

development is just beginning, which means that at present no basic possibilities are yet available to fishery plants for the utilization of lakes as fish hatcheries. Consequently, socialist cooperation will have to give efficient help in solving this problem, in order to offer concrete results to all fishery plants.

When reorganizing lake management, it will be necessary to consider in the first place the interests of those engaged in fishery. This principle is closely connected with the organization of breeding cooperatives. Like the methods used in eel breeding cooperatives, all breeding activities in the waters of certain districts will have to be coordinated. In districts where eel breeding cooperatives already exist, cooperative breeding should be extended to all fish species in question.

We take this opportunity to advise cooperatives of working fishermen, as well as individual fishermen, to have ready the financial means needed for adequate quantities of brood fish, as in cases where the establishing of hatcheries is not possible this is the sole guarantee of a full utilization of the productivity of lakes and rivers.

The increase of procutivity is closely connected with the tending and maintenance of waters. The extermination of hard flora has to be systematically pursued in order to stop the steadily increasing silting of our lakes. Today, it is no longer sufficient to breed and fish without systematically keeping the waters in good condition, which also includes the repair of dam installations. Quite a number of lakes, as for example those in the PwF [not identified; presumably a fishing cooperative] Rheinsberg, have sunk well below their original water depth, owing to the neglect of the dams. Valuable surfaces are thus lost for fishing purposes and opened to silting. In such cases speedy help should be given, in cooperation with local organs of water management, to raise the lakes to their original level within the shortest possible time.

The most important precondition for the increase of productivity and profitability in socialist enterprises is the mechanization of certain working processes, as well as improved fishing gear and fishing techniques. Omissions in this field should be speedily eliminated. As to the problem of mechanization, it can only be solved by the full cooperation of all fishery workers. Many enterprises have useful machinery

developed by colleagues in the national plants and members of cooperatives. These colleagues should report their results and submit suggestions for further development to the institute of Fishery.

National lake fishery enterprises still have to give increases help to weak or newly founded PwF's. It is especially necessary to exchange technical experience. Good beginnings in this respect can already be noted, for example in Potsdam Bezirk, where the VEB Fresh Water Fishery has organized a special center for the exchange of technical experiences in problems of duck fattening between all cooperatives. Such activities should, however, become general practice, and comradely help between socialist fisheries must be a constant component of their mutual cooperation.

The following important points should be carefully noted by the PwF's: as a result of the free use of state waters and exemption from taxes, the PwF's are in a position to use an important portion of their steadily increasing revenues for the enlargement of the production basis and the creation of additional cooperative property. Contributions to the indivisible fund are often too small. Every year our government extends important loans and large sums for the furthering of cooperatives. The time has come to start an over-all development with the aid of enabling all PwF's to work without state subsidies. As of 1 January 1960, the PwF's will have uniform operating plans and accounting bases, which will further improve their management and make possible exact comparisons between cooperative operations.

Some points of the now valid standard statutes for PwF's are no longer in accordance with their degree of development. Therefore, the statutes are to undergo certain changes in 1960; large-scale discussions should be organized in working fishermen's cooperatives to provide a basis for the new statutes.

As a matter of fact, PwF problems should be more often discussed in the press. It is certain that quite a number of good results could be make known and available for general utilization, but PwF members very seldom give reports on the activities of their cooperatives. So once more we wish to request them to tell us about their experiences and point out abstacles which still hinder our common tasks.

In dealing with the increase of production, we naturally cannot ignore the development of the German Anglers' Federa-

tion (Deutsche Anglerverbandes [DAV]). Everybody in our republic has the right to relax and to pursue the sport of his choice. In order to achieve constructive cooperation, is is first of all imperative that both groups, fisheries as well as the DAV, be willing to understand each other's problems.

To eliminate the existing misunderstandings, it is absolutely necessary that patronage contracts be concluded between the VEB's, the PwF's, and the local organizations of the DAV, on the basis of the agreement concluded between the Ministry of Agriculture and Forestry and the Presidium of the DAV.

Socialist cooperation means not only continuous cooperation between scientists and men of practice but also the joint efforts of the members of the DAV to solve fishery problems.

The reorganization of lake fishery will reduce fishing areas by approximately 15,000 hectares. The designating of these water surfaces for hatchery purposes is one of the basic preconditions of the further development of rational lake exploitation. Patronage contracts between fishery enterprises and the DAV will be the best means of overcoming this hindrance, as the sports possibilities of the DAV members will definitely be impeded by the use of lake areas for hatchery purposes. In order to explain the necessity of these measures to the DAV members, all DAV boards and fishery enterprises will have to organize large-scale information campaigns.

Let us now turn to the tasks of fish hatcheries. As already mentioned, it is absolutely necessary to speedily increase the per hectare yields. Although our per hectare yields of carp are already higher than those in West Germany (in 1958, West German yields were only 47 percent of those of this republic), the moment has come to organize production according to the tasks set by the Seven-Year Plan. This calls especially for raising highly efficient carp stocks, the rational utilization of natural fish food by adequate food supplements and organic fertilization, and, first of all, by raising ducks in open waters. Local councils should take this matter in hand, as private hatcheries (especially in Gera Bezirk) are very often insufficiently operated and sometimes not at all.

However, these measures are insufficient for securing carp supplies covering the needs of the population. It is neces-

sary to restore production in all pond surfaces with the help of the GUM [Gewasser-, Unterhaltungs- und Meliorationsbetriebe; Water, Maintenance, Regulation Enterprise].

The fresh water fishery VEB's should, even now, ensure that state surfaces at present leased to individual hatchers can be taken over in proper condition.

A further incentive for intensified production is socialist competition in national plants. The results achieved to date have shown the important success achieved by competitions between brigades in enterprises and between the plants themselves.

The goal is now to have all brigades compete for the title "Brigade of Socialist Work." Ideas such as the view that a brigade should consist of 50 or more members should not hinder development. This is a matter not of playing with numbers but of the principle of working, learning, and living the socialist way. We would be happy to print a report in this paper on the brigade activities of the Peitz and Koenigswartha National Fresh Water Fisheries, already competing for the title "Brigade of Socialist Work."

Duck-raising in open waters was also bery successful this year. Now that the basis for such activities has been created in some bezirks, duck fattening should be systematically pursued by organizing the cooperation of fresh water fishery production in the bezirks. In each of these, one or two enterprises should be responsible for the hatching of ducks and rearing them to the age of 21 days, and then handing them over to the other enterprises for fattening.

Naturally, these directives should also apply to bezirks with extensive lake surfaces. The goals should be to have, by 1961, open-water duck raising on all ponds used for hatchery purposes, and also on all suitable lakes. Our government will preferentially assign fattening fodder mixtures to fresh water fisheries.

In order to ensure production in 1965, a further increase of pond surfaces is necessary. This is especially important for the Potsdam, Neubrandenburg, and Cottbus Bezirks, where large areas are scarcely fit or definitely unfit for agricultural utilization but can be used for ponds.

A continuous carp supply also calls for the building of adequate reservoirs in fresh water fisheries. This problem becomes more and more important; local decisions should therefore speedily be taken in cooperation with state trade authorities.

Trout raising and fattening is the last branch of fresh water fishing to be mentioned.

Special stress should be laid on finishing the construction of units now being built in Potsdam and Schwerin Bezirks. According to local possibilities, fattening should also be intensified in other bezirks. It should be pointed out that fodder fish has be supplied by fresh water fisheries, with the exception of the Schwerin and Potsdam enterprises, which are also to receive fodder from the Fishery Combine Center.

Although they are more progressive than lake fisheries, hatcheries are still insufficiently mechanized. It is now imperative to make up for this neglect and to adapt the degree of mechanization to international standards.

The Brood Fish and Fish Raising Center, already entrusted with investigations concerning requirements, will also have to organized mechanization and the technology of production.

We wish to add a few remarks on the tasks of fishery schools.

The chief task of fishery schools is to train apprentices as fully qualified fishery technicians. The training of masters should also be improved; this can best be achieved by a close contact between technicians and their schools in the course of their studies for masters' examinations.

The qualifications of production workers in national enterprises and PwF's is also extremely important. The goal is to have all fishery workers qualified as technicians by 1965.

The first year of the Seven-Year Plan has already brought great success. The results achieved to date show that the 1959 plan has been fulfilled and overfulfilled, and that for the first time the 7,000-ton limit has been surpassed. On the basis of this year's results, steps must now be taken to ensure the 1960 plan. Efforts should be make to secure all necessary conditions for increasing the 1965 per capita consumption of fish and fishery products to 18 kilograms.

HUNGARY

Tenth Anniversary of the Mineral Mining Industry

[This is a translation of an article by Viktor Bauma, Mining Engineer of the Ministry of Heavy Industry, Chief Section of Ore and Mineral Mining, published in Banyaszati Lapok, Vol 93, No 1, January 1960, Budapest, pages 1-11; CSO: 3765-N]

Among the various branches of mining, the mining of minerals became a separate industry only under the First Five-Year Plan. In October and November 1949, the National Planning Bureau (Orszagos Tervhivatal) and the Ministry of Industry (Iparugyi Miniszterium) merged the mineral mining plants of the various ministries under the Enterprise for the Mining of Various Minerals (Vegyesasvanybanyaszati Vallalat) created especially for this purpose. In this article we wish to review the development of the mineral mining industry, on the occasion of its tenth anniversary.

At the time the mineral mining industry was formed, its production was conducted under the most primitive conditions. A considerable portion of the plants had no [narrow-gauge] railraods and cars. The creation of a separate mineral mining industry was very essential, because general industrial development could not be achieved without ensuring the production of the basic and auxiliary materials required. The new industry had to overcome the lag caused by small-scale but predatory mining.

The many products which the mineral mining industry supplie are needed primarily in the metallurgical and machine industry, the foundry industry, the fine ceramics industry, the glass industry, and in the chemical industry. Furthermore, these products are also of importance in foreign trade, partially as exports and partially as substitutes for imports.

When the Enterprise for the Mining of Various Minerals was formed, each of its plants bore the undesirable characteristic traits of small-scale predatory mining. For example:

[a] The former owners had provided only the most essential installations and equipment, at a minimum investment.

[b] The most primitive mining methods were employed, and all of the hauling was done with manual labor.

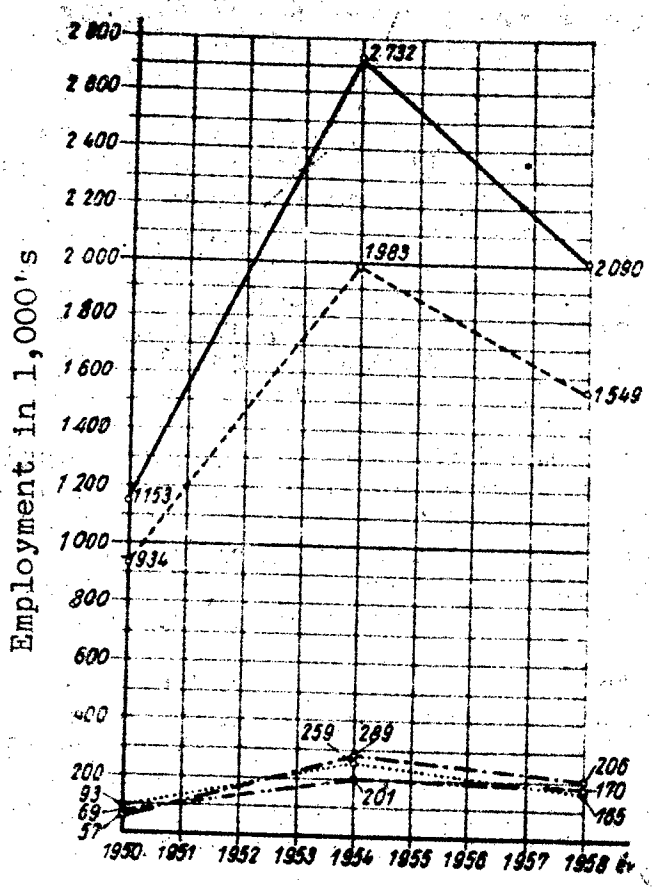
[c] The mineral deposits had been uncovered haphazardly, without any exploration, and they were squandered there predatory mining.

[d] The mines lacked every precaution and facility for safeguarding the workers' life and health and for providing tolerable working conditions.

[e] There were no facilities for storing the minerals mined with primitive methods, no suitable vehicles, no transportation systems, no loading installations, and no roads that could ensure access in all weather.

In view of the fact that 80 percent of the plants were surface mines, these conditions made both production and supply highly uncertain.

The solution of these problems was handicapped by the shortage of experts thoroughly familiar with special mining methods, which are highly diversified according to the ma types of minerals mined and the character of their deposits. Thus, paralell with the formation of the new industry, it was also necessary to train new experts for this field.



This general outline of the conditions that existe when the mineral mining in dustry was formed ten year ago provides a basis for evaluating the development which this industry underwent in 1950-1958. In vie of the fact that at the ti of writing the data for 19 are not yet available, we will close our report with 1958.

The diagram in Figure 1 shows the development of the total number of person employed in the mineral mi ing industry. From this

Figure 1. Development of the Labor Force in Mining

------ Industrial workers
-·-·-·- Technical workers
····· Administrative
------ Other ——— Total

.diagram it is evident that at the end of 1958 the total employment dropped considerably in comparison to 1954. The explanation of this drop can be found in the development of the production value and of the average production value per worker, shown in Figure 2. In 1958, the production value surpassed the 1950 level by 420 percent and the average production value per industrial worker by 220 percent. We achieved the

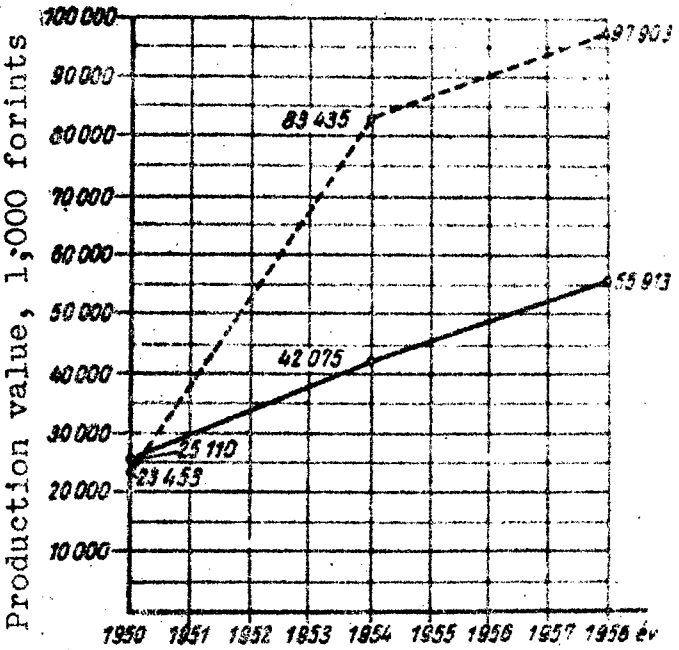


Figure 2. Development of Mining Production Value

------Production value
_____Average value per industrial worker

increase in the average production value per worker through a substantial modernization of the primitive mining and transportation methods and through mechanization. While the total production value rose 420 percent, the better productivity of labor necessitated only a 182-percent rise in employment.

The increase in production value was made possible to a considerable extent by the investments allotted for the development of the mineral mining industry. The diagram in Figure 3 shows that in 1958 the investments exceeded the 1950 level by 850 percent.

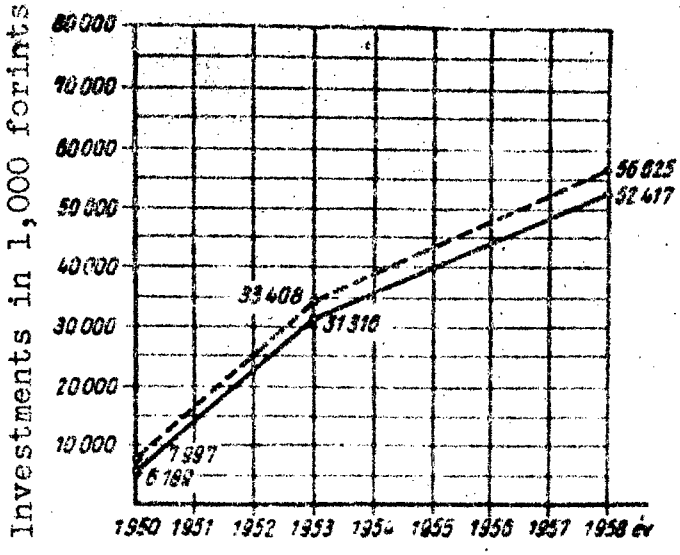


Figure 3. Development of Investments in the Mineral Mining Industry

------ Planned
_____ Completed

Because of the many products in the mineral mining industry, Table 1 includes only the most important ones, showing the quantitative and percentual increases in their outputs.

Table 1

Product	Annual Output (in tons) 1950	1954	1958	Percent Increase (1950 = 100 %)
1 Crude kaolin	15,837	25,490	32,586	205
2 Enriched kaolin	5,321	5,361	7,205	138
3 Bentonite	4,900	43,294	45,307	930
4 Processed bentonite	2,697	20,065	15,737	590
5 Foundry sand	102,578	283,470	188,884	184
6 Quartz sand	21,164	22,521	35,251	166
7 Refractory clay	31,455	90,340	87,124	276
8 Limestone	99,985	198,522	316,951	320
9 Dolomite	26,696	116,713	158,860	600
10 Quartzite	20,176	34,956	48,034	240
11 Crude talc	-	2,664	5,880	
12 Ground talc	-	2,768	4,717	

Figure 4 gives a breakdown of the consumption of the output of the mineral mining industry according to the supervising organs of the consumer industries. The percentual breakdown is computed on the basis of the production values. All production values are based on the price level introduced on 1 January 1954.

Figure 4

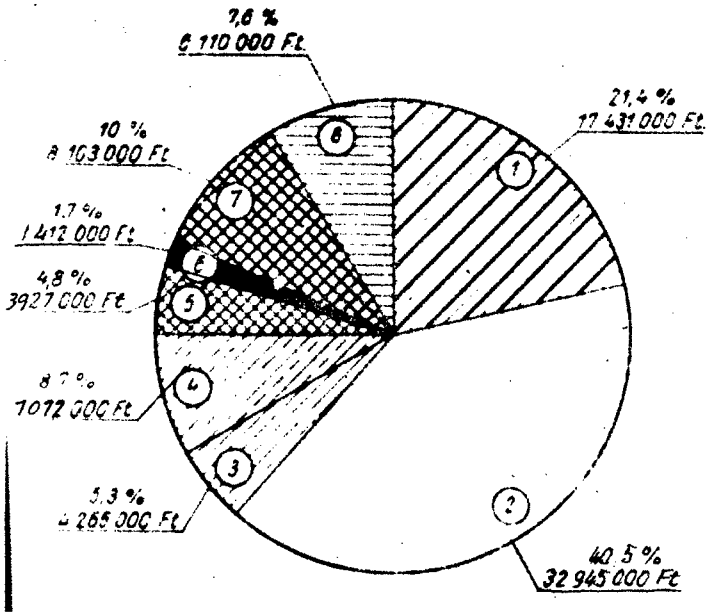


Figure 4. The 1958 Breakdown of the Consumption of Mineral Mining Product According to the Following Ministries:

1) Heavy Industry
2) Metallurgical and Machine Industry
3) Light Industry
4) Construction
5) Domestic Trade
6) Communications
7) Foreign Trade
8) Others

Ft = forints

In studying the ten-year development of the mineral mining industry it is also necessary to point out the shortcomings and mistakes that occurred, particularly at the start of its operation.

Considerable difficulty was caused by the fact that the prospecting and exploration of the mineral deposits had not been regular and systematic, despite the importance of the minerals as basic industrial raw materials. Very often the explorations were only informative or directly serviced production purposes. At that time the mineral mining industry lacked a cadaster of the nation's mineral deposits. Thus, in some cases the development of the mineral mining industry and the selection of new plant sites were not coordinated with the existing deposits of materials needed for industrial purposes. Since then the geological service has been formed, and we now have a complete cadaster of all mineral deposits that are being mined. The further development of this cadaster through systematic prospecting and exploration has been ensured.

Investments in the first period of the mineral mining industry did not follow a predetermined planned patter but often consisted of stopgap measures necessitated by momentary needs.

The construction of new processing plants and the modernization of the old ones proceeded very slowly. Even today some plants are using millstones 50 to 60 years old to grind their minerals. The homogenization of the ground minerals is still a difficult problem and impedes the standardization of the products. Although essential to ensure good quality, the drying of certain heat-sensitive raw materials is still unsolved. The construction of the mills and processing plants was begun only in 1958 and 1959. Today there is reason to expect that the existing shortcomings in this field can be liquidated within a short time. The processing of the minerals is also impeded by the fact that the consumer industries are showing a certain prejudice against domestic raw materials.

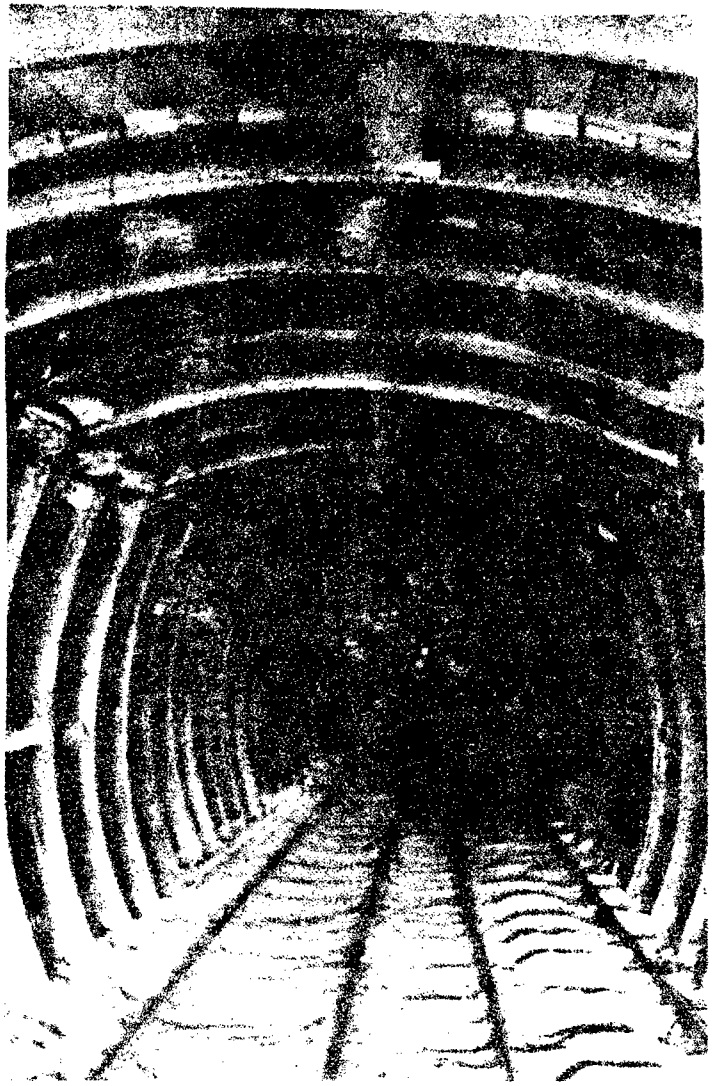
Because of the comparatively small volume of its production and the relative importance of other branches of mining, the development of the mineral mining industry was neglected. This affected domestic consumption unfavorably, as well as the possibilities for export and for the reduction of imports.

In the first period the rate of mechanization in the mineral mining industry was inadequate, particularly with regard to underground and surface transportation. The shortage of

mechanical transportation often affected production and caused bottlenecks in the supply of the industries during the winter months. Considerable progress has been made in mechanization. Mining and loading machines have replaced heavy labor, primarily in the quarries and pits. In these surface plants, experiments were made with work methods suitable for mass production--for example, with large bore holes for blasting and with seam blasting. These experiments have proved successful. In our underground mines we have given preference to the mechanization of transportation, because cutting and loading machines are not economical in mines with comparatively low production volumes. We have gradually converted to modern supports. "TH" and "Moll" [steel] linings are being installed in the tunnels that are under considerable pressure and will be in operation for some time. As illustrated in Figures 5 and 6, we are using such steel linings in the bentonite mine in Istenmezo and in the refactory clay mine in Felsopeteny. We are not experimenting with steel linings for the live workings and with steel roof supports. On the basis of the results achieved in the research on the processing and treatment of minerals, plants for the processing of quartz sand, refractory clay, kaolin, and bentonite have been built or are under construction. Processed and treated minerals will permit further cuts in imports.

We have devoted considerable attention to improving the workers' social, cultural and health conditions. Locker rooms and showers were built in all of our major plants, and we have endeavored to provide housing for our workers. One hundred dwellings have been built at the various plants of the mineral mining industry--in Mad, Perkupa, Romhany, and Felnemet. In these localities we are also building settlements for the miners. We also enabled 62 of our miners to build family homes of their own. A miners' settlement consisting of private homes has been development in Gyongyossolymos.

The Hungarian National Mining and Metallurgical Association (Orszagos Magyar Banyaszati es Kohaszati Egyesulet) has always devoted considerable interest to the development of the mineral mining industry. The space devoted in Banyaszati Lapok to scientific and technical articles on mineral mining has always been more than what the production volume of this industry would warrant. The Association recognized the importance of the mineral mining industry as early as 1951. At the general meeting of the Association on 17-18 March 1959, a special lecture was held on the national economic importance



Figures 5 and 6. Steel Lining in the Istermezo Bentonite Mine

of the mineral mining industry. This lecture was published in full in the July 1951 issue of Banyaszati Lapok.

Following the framework of the aforementioned lec ure, w wish to report on our outstanding installations and to illustrate them with photographs.

Mineral mining must be developed in its three branches: underground mining, surface mining [quarries and pits], and the processing and treatment of minerals.

In accordance with this grouping, we will discuss first our domestic refractory raw materials.

The supply base for refractory clay is the Felsopeteny-Bank-Romhany area. The other domestic deposits of refractory clay are insignificant. From these other deposits, refractor clay is being mined only where necessary in the course of mining other minerals. The Felsopeteny deposit has been explored with 140 test holes, drilled to an average depth of 80 meters each. The results of these explorations have permitted considerable investments. The primitive underground and surface transport systems have been liquidated. A narrow-gauge railroar 5.5 kilometers long links the mine with the railroad station, where a trestlework has been built to facilitate reloading. These investments have replaced carting and trucking complete. Refractory clays of the kaolin type will be discussed under kaolin.

Excavarion and stripping in the pits for quartz sand and foundry sand have been mechanized with bucket excavators and drum dredgers. The excavators used in the quartz sand pits in Kisors and Kovagoors are shown in Figures 7 and 8/a [not reproduced. Captions read as follows: No 7. Bucket Excavator in Operation at the Quartz Sand Pit in Kisors; No 8/a. The Mining of Quartz Sand with Bucket Excavators in Kovagoors]. The mechanized pit for foundry sand in Bicske can be seen in Figure 8/b. The over-

Figure 8/b: Mechanized Pit for Foundry Sand in Bicske

burden is removed with the aid of dumpers. Dumpers and trucks are used to transport the sand. The pit in Kisors was opened in 1959 in order to supply the dressing plant shown in Figure 9. Construction of the dressing plant was begun in 1958. Trial operation will begin late in 1959. The purpose of the dressing plant is to supply the plate glass factories with washed quartz sand containing 98 percent SiO_2 and not more than 0.15 percent Fe_2O_3.

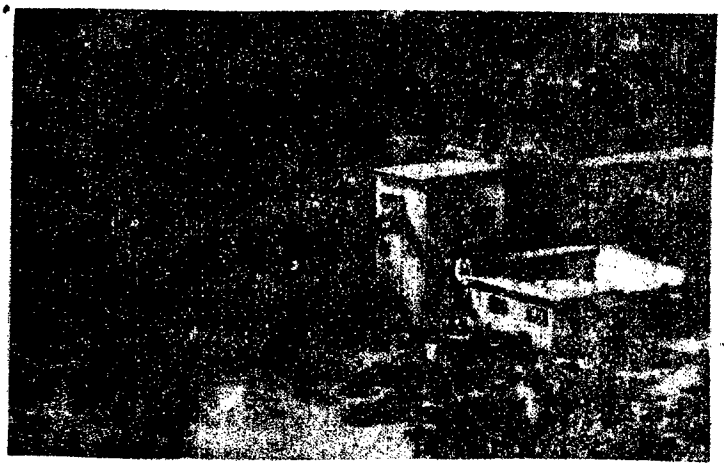


Figure 9

Dressing Plant for Quartz Sand in Kisors

A dressing plant for find quartz sand is under construction in Fehervarcsurgo and is planned for completion by the end of 1960. The technological process of this plant has been worked out by the Mining Research Institute (Banyaszati Kutato Intezet). Special credit is due the institute for designing the flotation process and for developing a reagent equal to the kind that up to now could be obtained only in the United States. The dressing plant will produce quartz sand containing 99 percent SiO_2 and 0.03 to 0.05 percent Fe_2O_3, whereby further cuts can be made in imports. The construction of this dressing plant is shown in Figure 10/a. The technological process is illustrated in the diagram in Figure 10/b.

The pits for foundry sand are being equipped with drum dredgers. Dumpers and trucks are used to move the overburden and to transport the sand to the railroad station. The drum dredgers used in the pits for foundry sand in Bicske and Erd and in the dolomite quarries can be seen in Figures 11/a and 11/b. [Figure 11/a not reproduced. Caption reads: Drum Dredger in Operation in the Dolomite Quarry in Pilisvorosvar.]

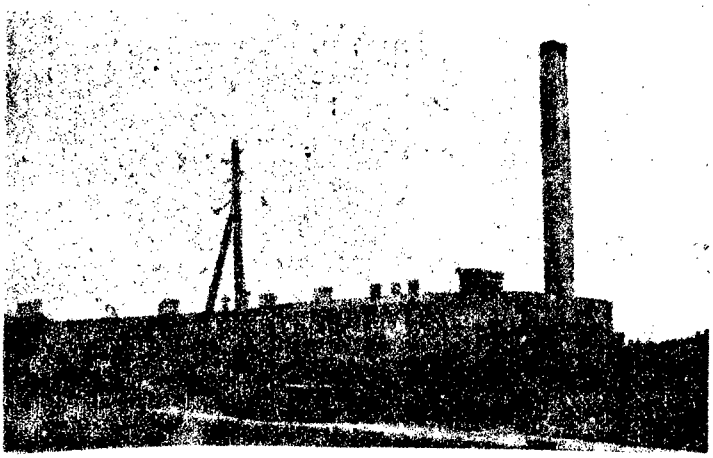


Figure 10/a

Dressing Plant for Fine Quartz Sand in Fehervarcsurgo. Under Construction.

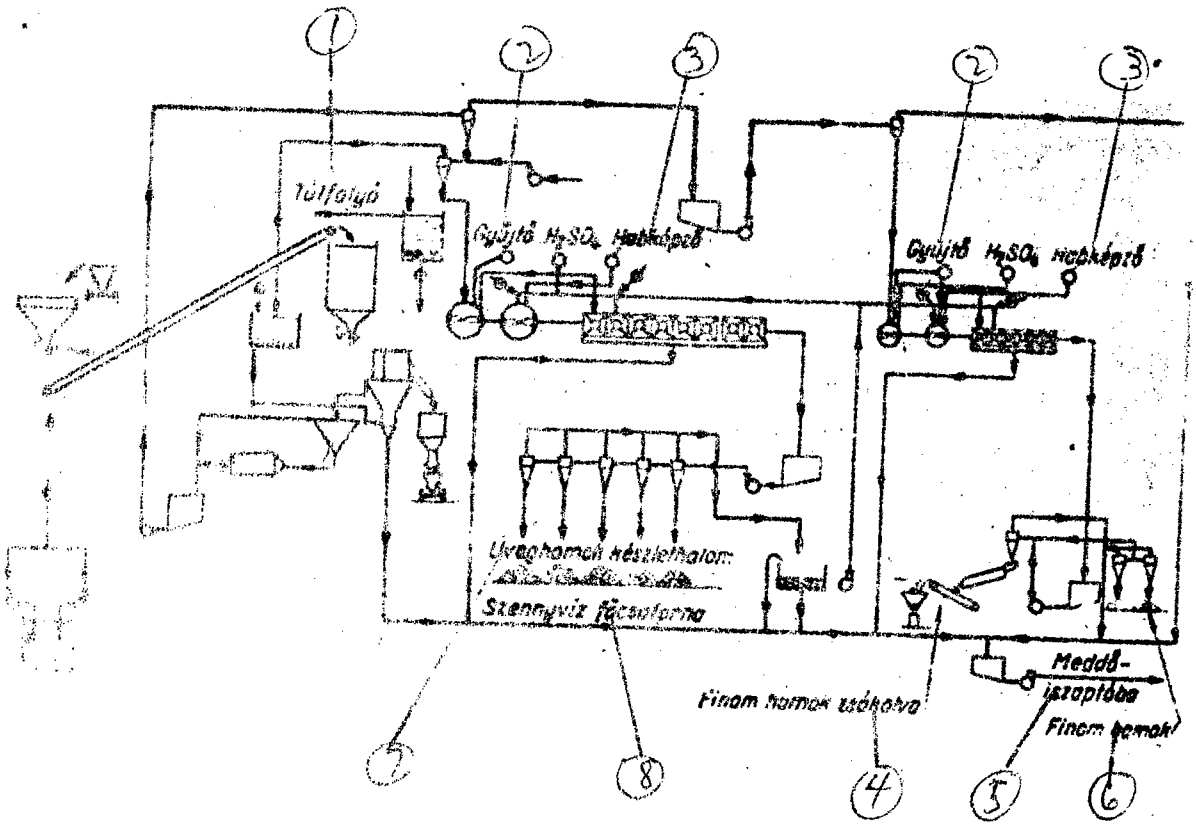


Figure 10/b. Diagram Showing the Production Process of the Dressing Plant for Fine Quartz Sand. The plant is under construction.

1) overflow
2) collector
3) frother
4) fine quartz sand packed into bags
5) to sedimentation pit
6) fine quartz sand
7) quartz sand storage pile
8) drainage main

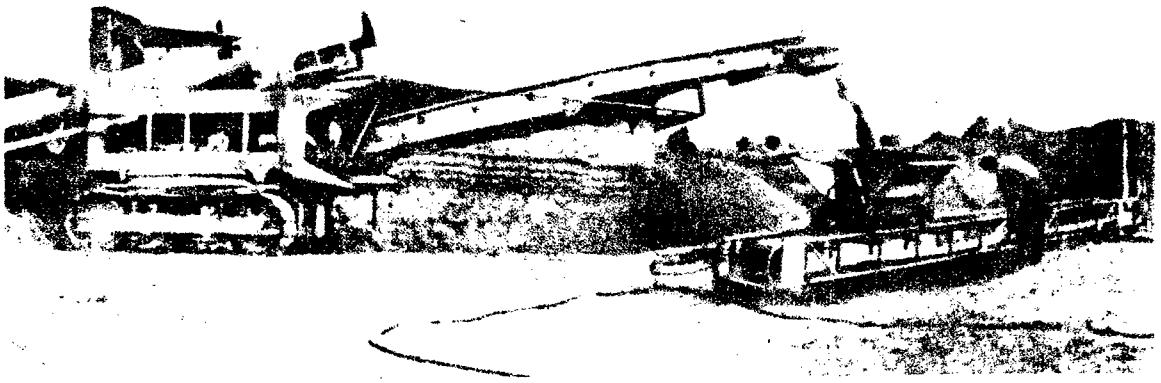


Figure 11/b

Drum Dredger in the Pit for Foundry Sand in Bicske

The mines in Mad, Istenmezo, and Budateteny have been developed for the production of bentonite and Fuller's earth. At the Mad-Koldy plant--which produces the most important ingredient for the various types of processed bentonite--geological exploration has ensured the supply for a long time. Thus, the supply of the domestic processing plant is ensured. At the Istenmezo mine, mining is rendered difficult by the frequent throws in the deposits. The development of the Budateteny mine is hampered by the narrow seams, only 35 to 40 centimeters wide, and by the small volume of the deposit. Figure 12 illustrates the difficult mining conditions in Budateteny. Mechanization is not economical becau of the low output. The mechanization of transportation will

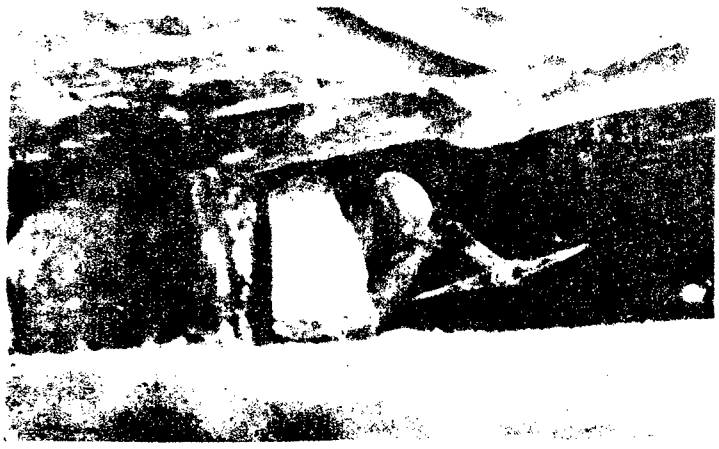


Figure 12

The Mining of a Narrow Seam in the Bentonite Mine in Budateteny

reduce the amount of heavy physical labor required. We are exporting crude bentonite to Czechoslovakia and East Germany. The various types of processed bentonite used to bind foundry sand, seal dams, and serve as drilling fluid serve industrial purposes both at home and abroad. Despite efforts at modernization, the processing of bentonite is not entirely satisfactory. Construction work on a modern bentonite processing plant in Mad was started in 1959; it will be ready by the end of 1960. Figure 13 shows the old bentonite processing plant which is still in operation. Figures 14 and 15 show the models of the new bentonite processing plant as it will look when completed.

We have installed modern milling machines in the old milling plant, but the problem of homogenization is still unsolved. In the new mill the bentonite will be ground with moderni machines, and considerable attention is being devoted to homogenization and dust control. Pallmann type beater plate grinders will be installed in the mill to obtain super-fine ground bentonite.

In Hungary, the most important deposits of kaolin occur in the Tokaj foothills. Considerable effort is being devoted to prospecting and exploration. The National Geological Chief Directorate (Orszagos Foldtani Foigazgatosag) has started a detailed exploration project and is now working on the long-range exploration of the Mad area.

The mineral mining industry has ensured the deep test drillings and explorations essential for mining. Work in the Szerencs area has already yielded new deposits of kaolin and bentonite, which will enable Hungary to further improve the spply of her fine ceramics industry with domestic raw materials.

At the kaolin quarry in Mad-Bomboly we are exploting the size and quality of the deposits with the aid of test drillings and adits. A raod was built to solve the transportation problem. Because carts often bogged down when the road was muddy, we have replaced the carts with trucks. The paper industry is being supplied [with kaolin] from the kaolin mill in Szegi, shown in Figure 16. This mill was modernized in 1958 and was equipped with Pallmann type beater plate grinding machines. In this manner the mill has been able to meet the specifications for finely ground kaolin required in the paper industry. The grinding and drying capacity of the mill has been increased considerably. In order to eliminate surface

Figure 13. The Present Bentonite Dressing Plant in Mad

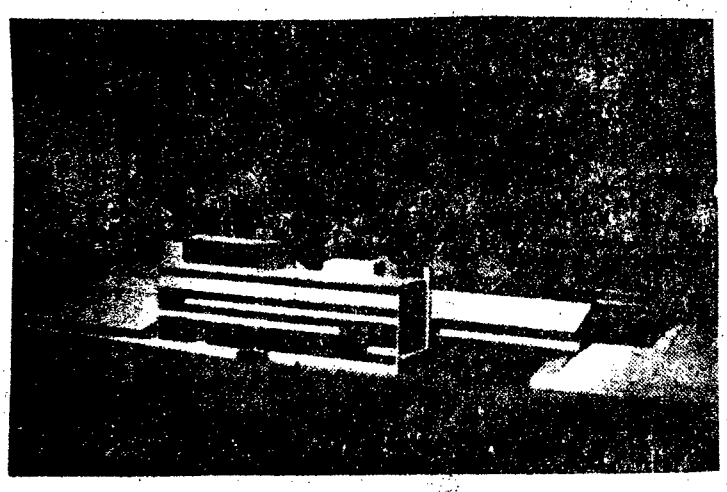


Figure 14.

[Model] of the Bentonite Dressing Plant in Mad, Now Under Construction

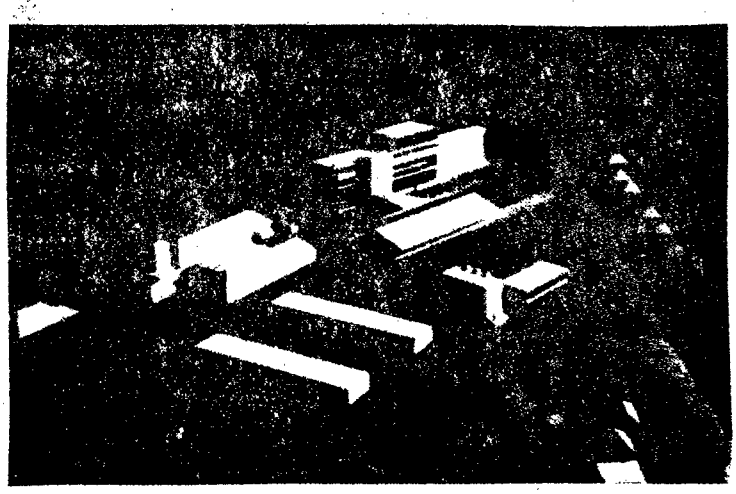


Figure 15.

[Model] of the Bentonite Dressing Plant in Mad, Now Under Construction

Figure 16. Kaolin Mill in Szegi

Figure 17. A Section of the Adit in Szegi

Figure 18. The Old Mine Hoist in Szegi

transportation, a 1,700-meter adit was built, through tuff and pumice sand, from the underground kaolin mine in Szegilong to the kaolin mill in Szegi. A section of this adit can be seen in Figure 17. The old mine hoist (Figure 18) was characteristic of the conditions in Szegi. Breaks in the links of the hoist chain often tied up transportation. The aforementioned adit was built to replace the shaft and the hoist.

Large-scale explorations are under way at the underground kaolin mine in Fuzerradvany, an important basis of supply for the fine ceramics industry.

The construction of the kaolin washing plant in Sarisap was an important improvement in the processing of kaolin. Thi This plant, the first of its kind in Hungary, started production in the beginning of 1959. Its technological process differs consdderably from the methods employed by foreign kaolin-washing plants. The technological process was worked out by the Mining Research Institute. Separation is done with the aid of hydrocyclones instead of the usual channel method. The kaolin washing plant is shown in Figure 19. Its filtering and drying room can be seen in Figure 20.

The washing plant is supplied from the kaolin-bound siliceous quartz sand (silicol) pit in Sarisap. The silicol contains 15 to 20 percent kaolin. Because of its high refractory qualities, the silicol is also used in the foundry and metallurgical industries. The mechanization of the pit is under way. It is being equipped with drum dredgers of the type used in other sand pits.

We built a 5-kilometer narrow-gauge railroad line to transport the materials to the washing plant and the railroad station.

Talc mining has been developed to where it is now able to supply 90 percent of the domestic demand, which means a 90-percent cut in imports.

The talc mill in Felsocsatar has been modernized. The installed Pallmann type beater plate grinding machines produce ground talc of the required fineness. In addition to cutting the import of fine talc powder, this plant is also working for export.

The explored and uncovered talc deposit will be able to ensure the supply for a long time.

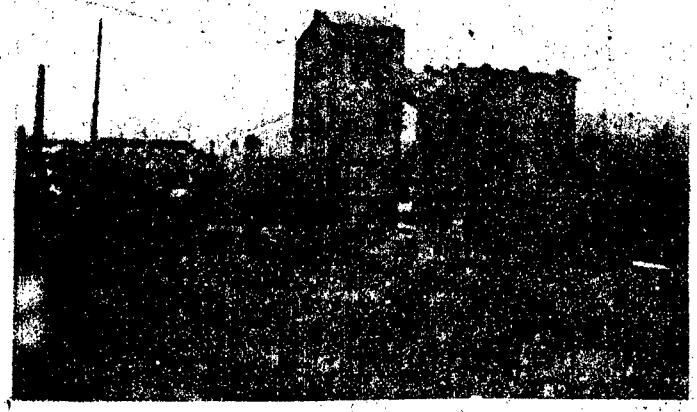


Figure 19. The Kaolin Washing Plant in Sarisap

Figure 20. The Filtering and Drying Room of the Kaolin Washing Plant in Sarisap

Considerable progress has been made in the mining of limestone and dolomite. At the limstone quarry in Felnemet, the crushing plant and mill shown in Figure 21 were placed into operation in 1959, and a trestlework was built to facilitate reloading. The rough limestone from the crushing plant is used to supply the metallurgical industry. The smaller lumps are ground in the mills, and the ground limestone is used for agricultural purposes.

The development of the limestone quarry in Bukkosd is under way. Here a high-capacity lime kiln is being built to supply the needs of the metallurgical industry.

The output of the dolomite quarry in Pilis serves the supply of the metallurgical and construction industries. A narrow-gauge railroad (Figure 22) 6 kilometers long was built to link the quarry with the Pilisvorosvar railroad station, where modern facilities and a trestlework (Figure 23) were also built.

Mining and transportation in the dolomite quarry have been completely mechanized, as can be seen in Figure 24.

The aplite mined in Szekesfehervar serves as a substitute for the feldspar needed in the fine ceramics industry. The Mining Research Institute has worked out a technological process for the enrichment and refining of aplite. The construction of a plant for this purpose is included in our long-range plans.

Hungary's first gypsum and anhydrite mine was opened in Perkupa. The gypsum and anhydrite deposit lies in a depth of 20 to 200 meters.

Mining is rendered difficult by the fact that the deposit is covered with a 6- to 20-meter layer of alluvial gravel, which permits the water of the nearby Bodva to pass through. The gypsum-anhydrite layer itself is impermeable, but faults in the gypsum block might cause affluxes of water at a rate of 8 to 10 cubic meters per minute. For this reason the relatively safest room mining method has been introduced. Bentonite and trass concrete were used to seal out the water from the shafts. This is the first application of this method in the history of the Hungarian mining industry. The hoisting shaft was sealed with bentonite and the ventilation shaft with trass concrete. Both are completely waterproof. The tower of the hoisting shafts is shown in Figure 25.

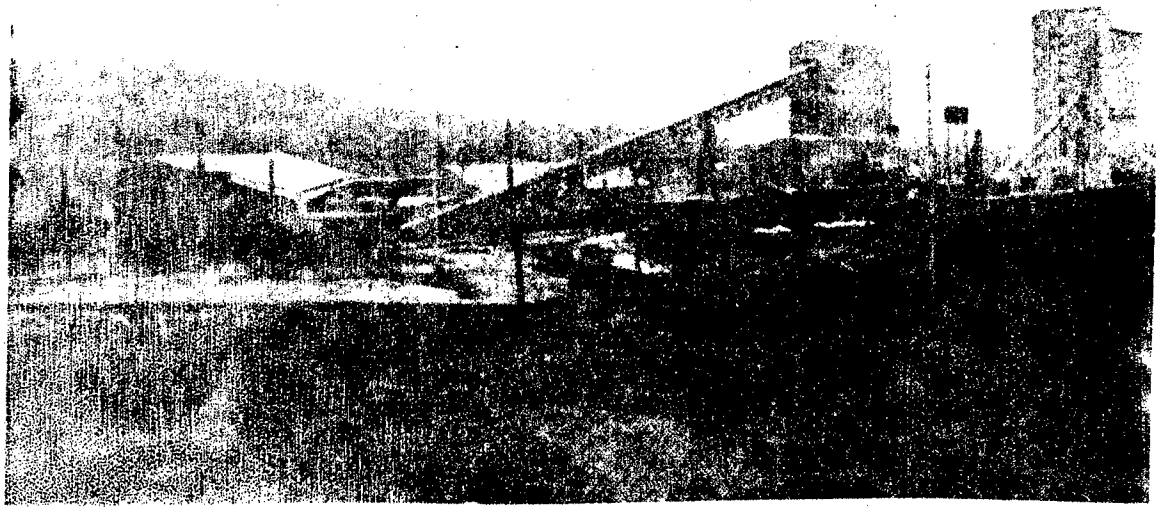


Figure 21. The Limestone Crushing Plant and Mill in Felnemet

Figure 22

A Section of the Narrow-Gauge Railroad at the Pilisvorosvar Dolomite Quarry

Figure 23. Trestlework for Loading at Pilisvorosvar Railroad Station

Figure 24. Dolomite Quarry in Pilisvorosvar

Figure 25. Hoisting Shaft at the Gypsum-Anhydrite ne in Perkupa

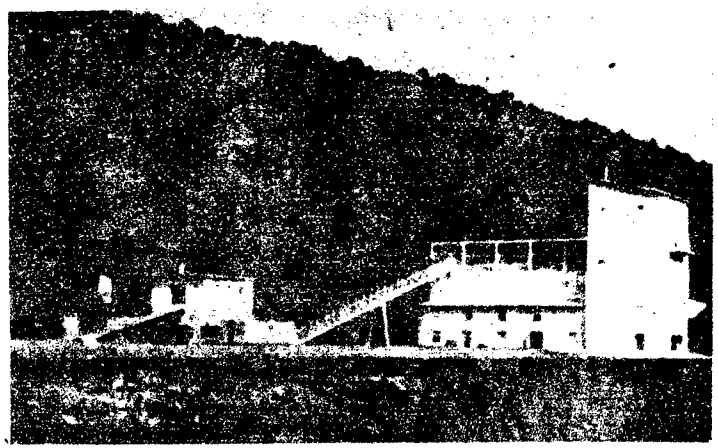


Figure 26. The Anhydrite Mill in Perkupa

Work is under way on the technology of burning the gypsum and anhydrite mined in Perkupa. On the basis of this technology, the construction of a gypsum factory has been included in the long-range plans. The anhydrite mill shown in Figure 26 was completed and placed into operation in late 1958. The ground anhydrite is used for soil improvement purposes.

Experiments with the puzzuolana found in the Tojak foothills are under way. There is reason to expect that these cementing materials, widely recognized abroad, will soon get the attention they merit.

Another task of the mineral mining industry is the mining and processing of perlite. The latter plays an important role in the construction industry and in heat and sound insulation. In Hungary, there are large deposits of perlite along the Gonc-Telkibanya-Palhaza line. With proper heat treatment, the perlite swells to about 10 to 15 times its original volume, and its bulk density is low. For this reason and because of its excellent insulating properties, perlite is suitable for the production of light building and insulating units [blocks, panels].

The mined perlite is broken into grains 0.3 to 1.5 millimeters in diameter before it is shipped for processing or export. Hungary is already exporting crushed perlite. Perlite mining was begun in Palhaza, where the mill shown in Figure 27 was completed in 1959.

The drilling industry, the foundries, the enamel industry, the ceramics industry, and the construction industry require ground minerals of varying fineness. These are supplied by two mills in Budapest. At the time when the mineral mining industry was formed, these mills had obsolete grinding and drying facilities. Consequently, they were unable to produce ground minerals of the fineness required. The combined total capacity of these two mills was less than 5,000 tons per year. Since then we have modernized these mills, equipping them with beater plate and roller grinders and with drying installations. Their [combined total] capacity has been increase to 50,000 tons per year. For reasons of municipal planning, however, the mills must be moved out of Budapest. Their work will be taken over partially by the mill now under construction in Mad and partially by the mills in Zebegeny and Pilisvorosvar. The Zebegeny mill is under construction; the Pilisvorosvar mill is in the planning stage.

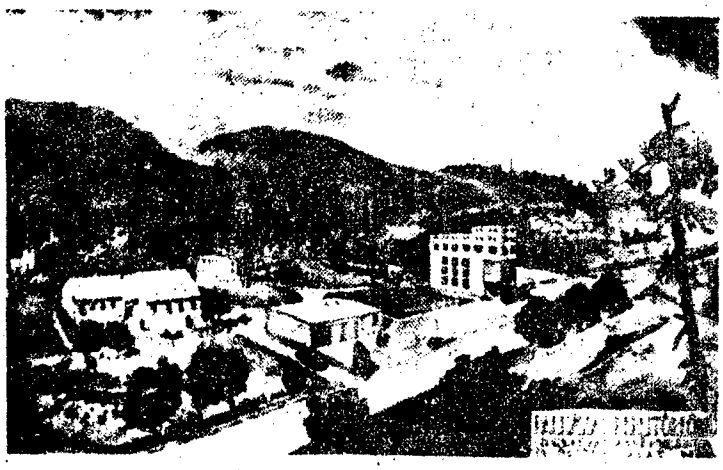


Figure 27. The Perlite Mill in Palhaza

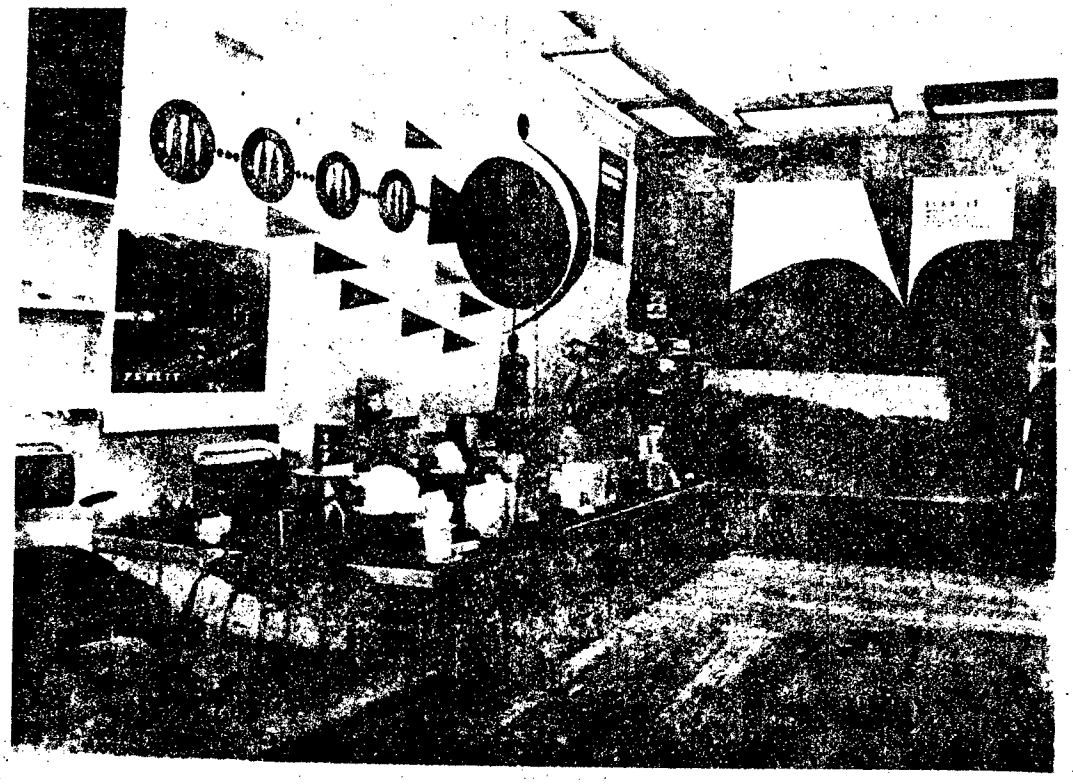


Figure 28. Exhibit of the Mineral Mining Industry at the 1959 Spring Fair

We wish to mention that the mineral mining industry was among the exhibitors at the 1959 Spring Fair in Budapest. The water sealing properties of bentonite were demonstrated. The more important products of the industry were displayed as shown in Figure 28.

With its new plants, the mineral mining industry under the Second Five-Year Plan will increase its production 80 to 90 percent over the present level. With the aid of advanced technical methods, the mineral mining industry is striving to constantly improve the quality of its products, thereby enabling the consumer industries to make further cuts in their imports.

- END -

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FOR REASONS OF SPEED AND ECONOMY

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